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"PERFORMANCE AND PRICE COMBINE TO MAKE THE POWERCENTER THE MOST SENSIBLE CHOICE FOR BUSINESS AND GRAPHICS." – Macworld Magazine, July, 1996

"POWER COMPUTING'S AWARD-WINNING PRODUCT LINE IS WELL POSITIONED. POWERCENTER IS THE BEST ENTRY LEVEL, UPGRADEABLE POWERPC 604 SYSTEM ON THE MARKET."

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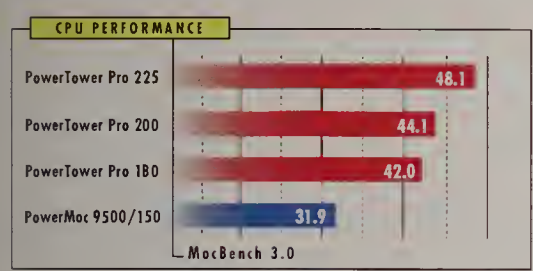

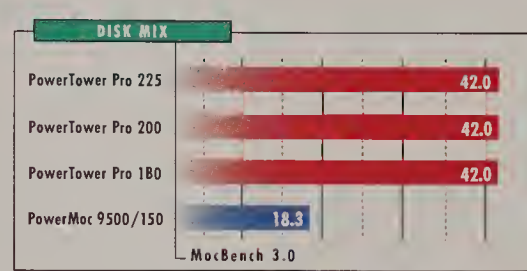

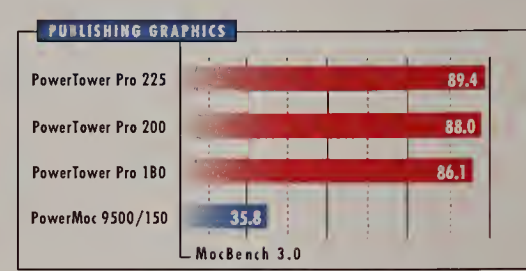

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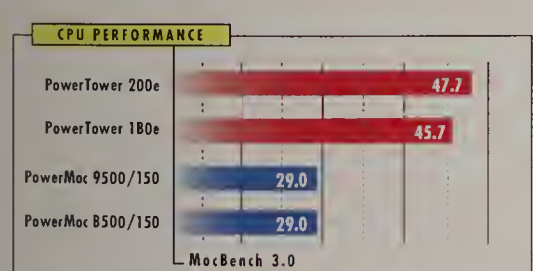

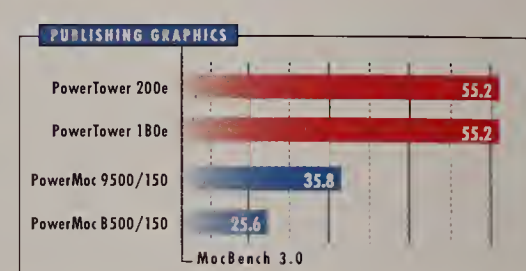

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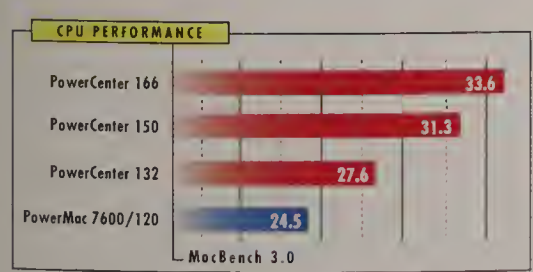

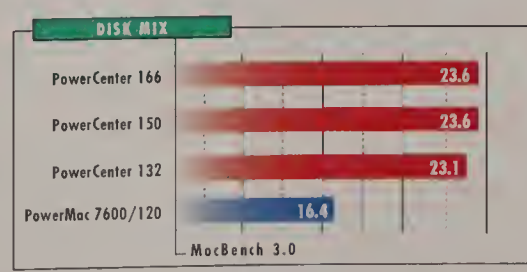

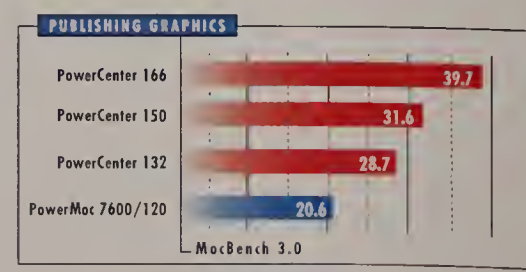

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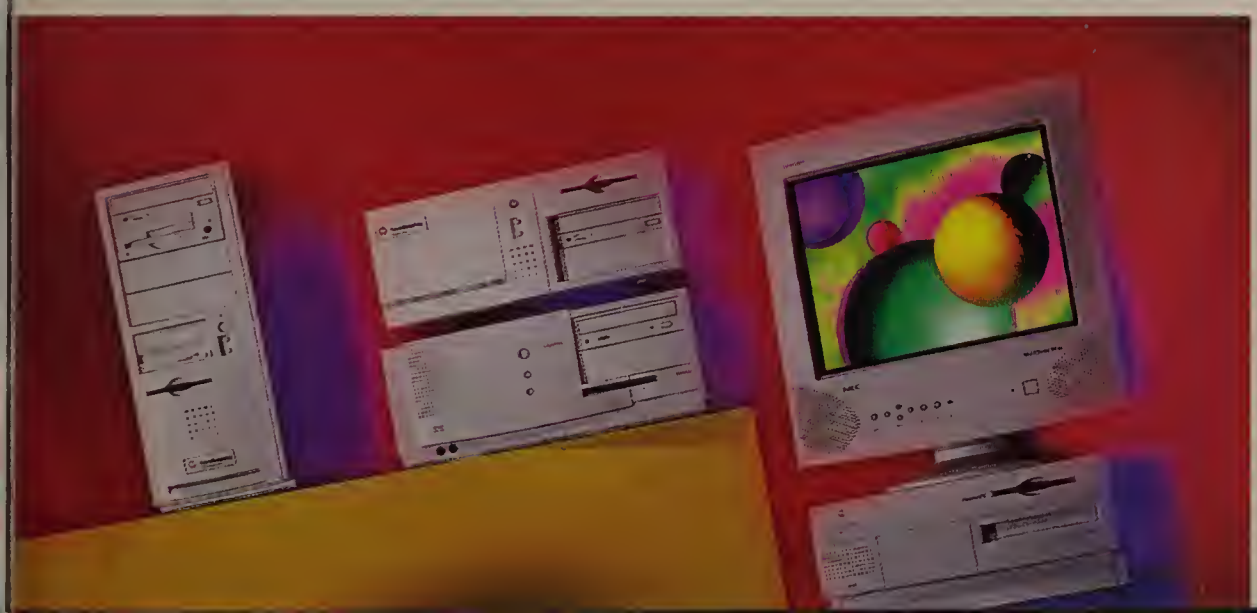

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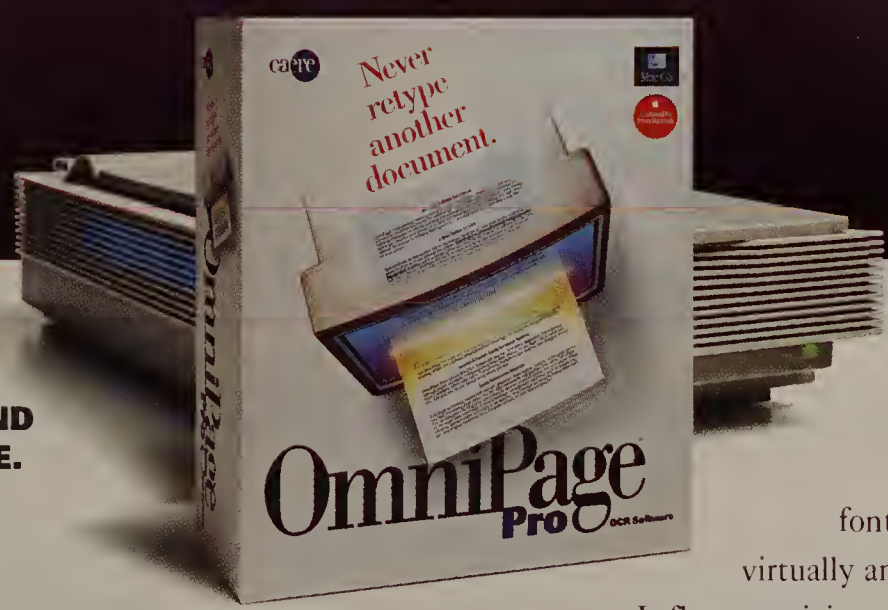

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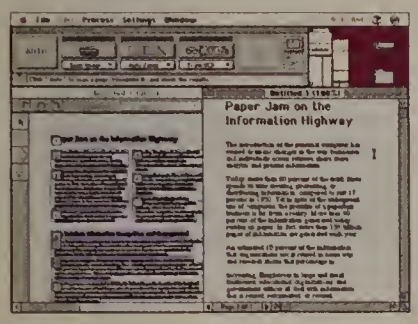

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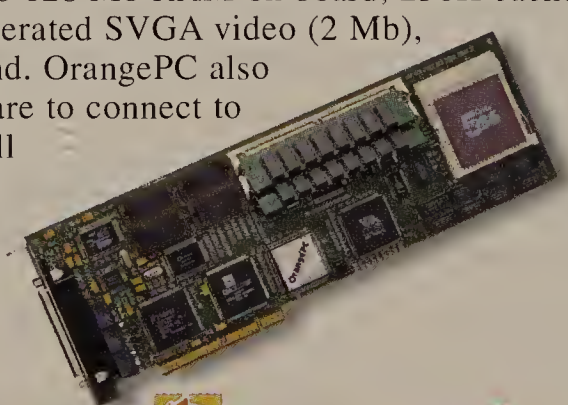

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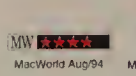
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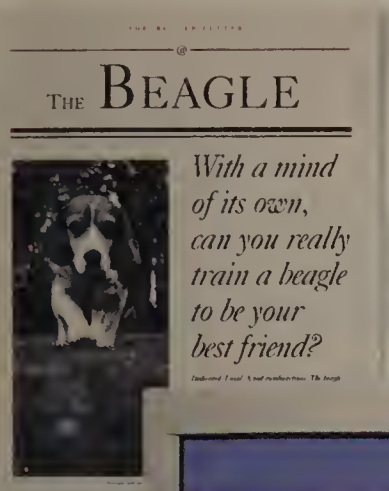

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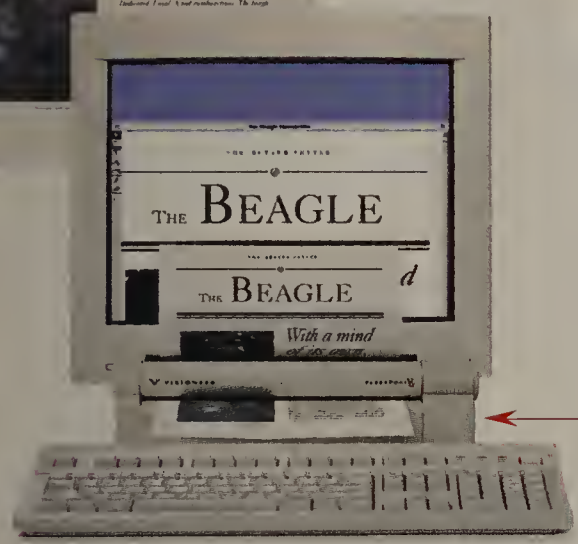

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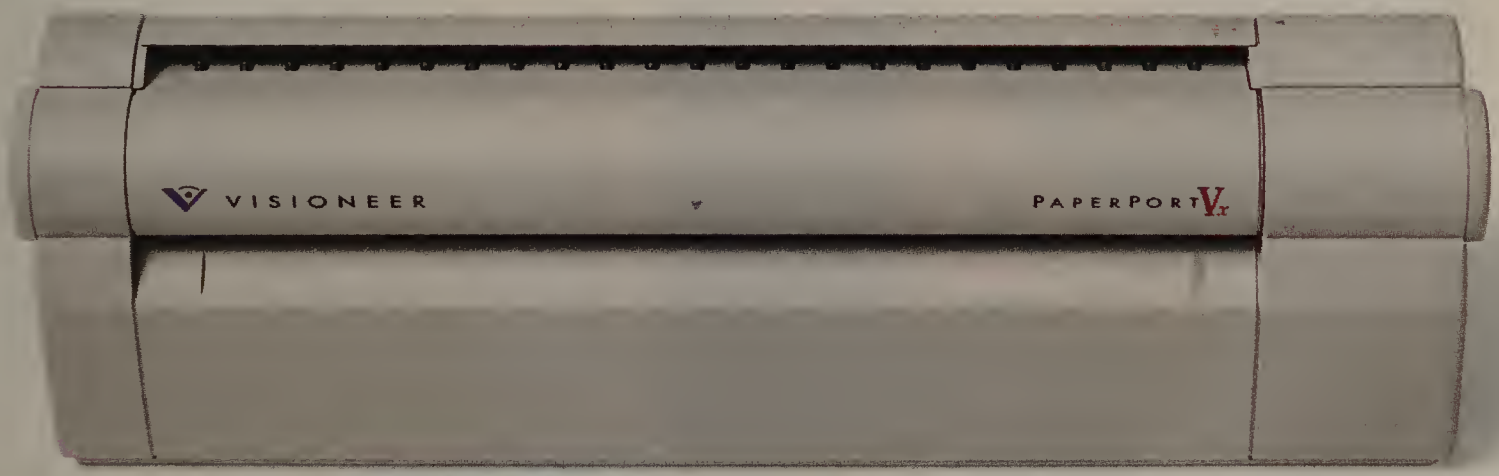

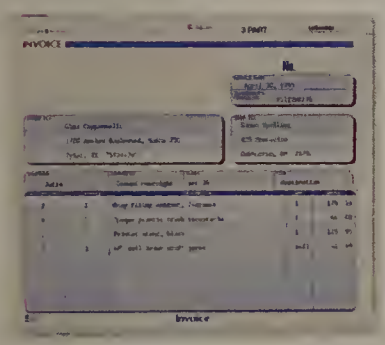

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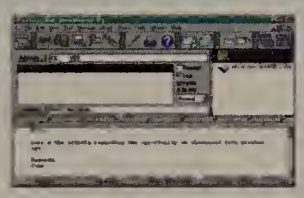

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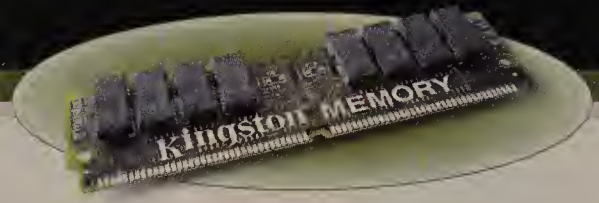

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Letters

A Star Is (Re)born

THE MAC REBORN" WAS AN EXCELlent, exciting, and visionary article (September 1996). Without a doubt, it was the most thrilling Mac-related article I have ever seen, and my friend and I are waiting anxiously to buy an Enterprise or a Galileo. The blend of practicality and performance and the emphasis on the computing experience was fabulous and pleasant to see. I hope Apple will have the good sense to listen to the positive outcry this article will surely generate.

CHRISTOPHER M. VOUDOURIS
Sacramento, California

MACWORLD PRESENTED A VIABLE and pleasing design for a desktop Mac. It would take a little getting used to, but it is functional and futuristic-looking. But the design for the PowerBook is very funny-looking, even if it is functional. I would be embarrassed to unwrap it in the presence of others. Take a good look at it again. With those speakers it looks like Ross Perot.

DANIEL GAGNER
Sanford, Maine

IF YOU WERE TO BUILD ANY OF THE systems in "The Mac Reborn," I would buy them.

CHRIS SCHWARTZER
North Wales, Pennsylvania

THE FROGDESIGN CONCEPT MACS ARE impressive, especially in terms of ergonomics. After all, there really is no reason for the cable clutter we've been enduring, and no reason not to incorporate an ergonomic keyboard into every Macintosh package. Still, in all the curved and adjustable keyboards I have seen, including your version, one aspect of the keyboard needs changing.

When I balance my extended keyboard on my lap, I constantly struggle to keep it from sliding off to the right. Why not move the arrow and auxiliary keys (help, home, page up, and so forth) off to the left? If lefties have adjusted, couldn't we righties? This change would not only improve the keyboard's balance on my knees, but would also center it better on my desk.

CHRIS LOZAC'H
Portland, Oregon

Mondo Bill Gates

WANT TO KNOW HOW UBIQUITOUS Bill Gates is? I was glancing at the headlines in your Macworld Online site when I saw "Senate Hears Encryption Export Testimony" with the tag line, "Bill would do away with 40-bit key limit." Guess which Bill I was thinking of? It's times like that when I hug my Mac Plus for reassurance.

BILL MARCOTTE
Châteauguay, Quebec, Canada

Interfaces Only a Mother Could Love

MR. POGUE IS OBVIOUSLY A FAIRLY smart man, given that he uses the Mac, so I was surprised to read that he was unable to come up with a better way to eject a floppy disk than to drag it to the Trash (*The Desktop Critic*, September 1996). All you have to do is click on the disk once to highlight it, then use ⌘-Y for Put Away (under the File menu).

TAIT SCHLEISMAN
Slayton, Minnesota

Tait, you could've sent this to Lon Poole at quicktips@macworld.com *for $25.—Ed.*

INSTEAD OF JUST LISTING A COMPANY phone number in an application's About box, as David Pogue mentioned, Bare Bones Software goes one better. If you've got Internet Config installed, the Apple menu lets you go straight to Bare Bones' Web page or E-mail the company—and yes, the features are grayed out if Internet Config isn't installed.

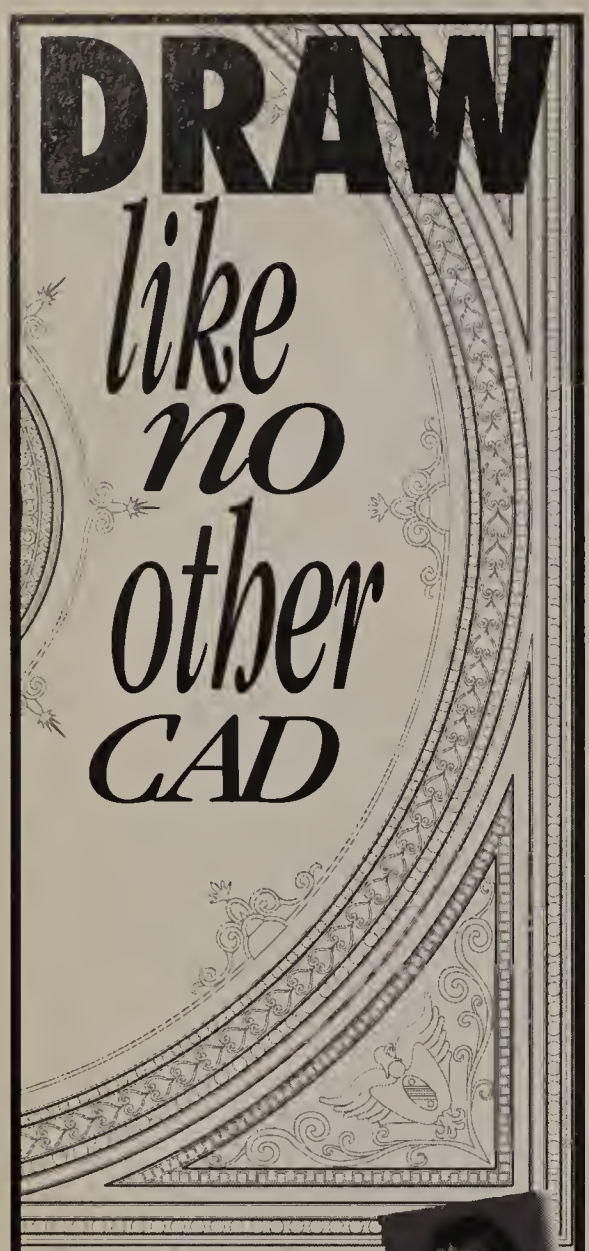
SCOTT D. SAUER
Lancaster, New York

REGARDING POGUE'S COMMENTS ON printing one copy, I most often do print only one; I just hit the return key. But when I want to print multiple copies or only part of the document, then I need and very much appreciate the full range of choices given in the Print dialog box.

ROBERT MUMBY
Honolulu, Hawaii

continues

GORDON STUDER



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CORRECTIONS

- *Portions of Motorola's 33MHz 68040 CPUs run at 66MHz internally ("The New Speed Champs," July 1996).*
- *The Mac tries to run the system bus as close to 50MHz as possible while staying at a whole-number multiplier for the CPU speed ("The New Speed Champs," July 1996).*
- *Both Newer Technology's Nupowr for PowerBook 500 Series and Apple's PowerBook 500 PowerPC Upgrade accept up to 32MB of existing RAM, for a total RAM capacity of 40MB* (Reviews, *August 1996).*
- *The phone number for CyberGauge* (Reviews, *November 1996) is 510/283-9771.*
- *You can see Mac file and creator types through the Windows 95 Properties function with PC MacLAN 6.0 for Windows 95* (Reviews, *November 1996), but the program can't import file and creator type information directly into its extension map.*

DAVID POGUE SUGGESTED THAT PROgrammers implement a Print One Copy command in an application's File menu. Well, imagine my surprise and delight upon finding that very command in my recently upgraded copy of WordPerfect 3.5.1. Not only did it print one copy, it printed one copy of each WordPerfect document that was open at the time. Hats off to the programmers at WordPerfect who implemented this simple but timesaving menu item.

JACK DEVRIES
Ancaster, Ontario, Canada

Now That's Service!

PLEASE ACCEPT MY CANDIDATE FOR A true service hero. About seven years ago, I purchased a computer rolltop desk that used metal drawer glides made by Accuride. These glides are high quality, which is one of the reasons that I chose this particular desk.

This summer, a little plastic tab on the glide lock became brittle and broke off, and the felt bumpers were beginning to wear off. I wrote both the desk manufacturer and Accuride to see if they could lead me to someone who would sell me replacement parts.

The desk manufacturer has apparently gone out of business, but Accuride mailed numerous replacement parts to me at no charge. Even more phenomenal, they then called to make sure they sent the right parts! When I told them the plastic tab was of a different size, they had me speak (still on their long-distance bill) to one of their craftsmen to make sure I got the right part.

BRIAN A. FOSTER
Castro Valley, California

They're All Dongles to Me

SEVERAL PARAGRAPHS INTO DOUGLAS Adams's article, I became confused by his use of *dongly thing* (*Viewpoint*, September 1996). I later realized he wasn't referring to the hardware keys (also known as dongles), which many software programs use for copy protection; rather, he was referring to the transformer wall-plugs that accompany virtually all electrical appliances.

I agree with Mr. Adams—it's ridiculous that all electricity supplied to our homes is AC, yet many appliances require DC power, so we must transform the AC to DC and step it down from 120 volts to 9 or 12 volts, losing some of the power in the process.

I myself am building a home that will be supplied entirely by photovoltaic (solar) power. Although I'll have an inverter to convert some of the DC battery power to AC for those appliances that require it, I will wire the house with DC circuits and purchase as many DC appliances as possible for the simple fact that it's pointless to waste energy converting DC to AC.

Since I can run my PowerBook from batteries, I'll be able to plug it into my future home's 12-volt DC system. It's a shame regular desktop computers can't be as flexible in their power requirements.

ROGER SPENDLOVE
Pine, Colorado

You go, Roger!—Ed.

A Question on Suitcase

I FOUND YOUR REVIEW OF SUITCASE and MasterJuggler Pro helpful (*Reviews*, September 1996). One question,

continues

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>
> *—Mac Home Journal, August 1996*

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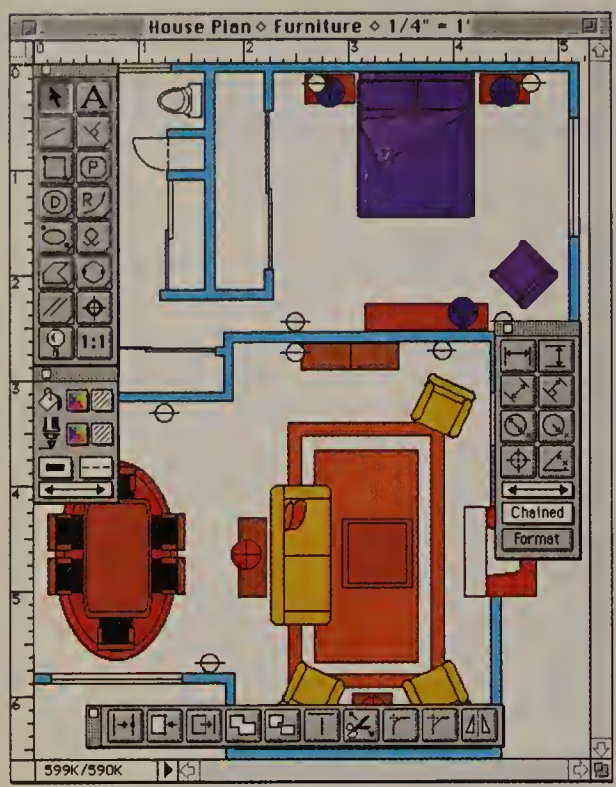

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though: Macintosh Technical Notes (*http://www.teka.com/technotes.html*) reports that Suitcase 2.X is not compatible with System 7.5.2 and higher. The review didn't note whether this problem has been resolved with Suitcase version 3.0.1. Do you have any further information on this?

JACK FERMAN
Minneapolis, Minnesota

According to Symantec, Suitcase 3.0.1 has been completely rewritten and is both Power Mac–native and compatible with System 7.5.X.—Ed.

Online Cookies

NOW THAT I'M USING NETSCAPE 3.0, I get messages every now and then that someone wants to send me a cookie. What is a cookie and should I accept it?

DAN KASTEN
Edwardsville, Illinois

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And if you decide that cookies aren't for you, get Cookie Monster from our Web site or from America Online (keyword Macworld*).—Ed.*

Paragraph Styles

DAVID BLATNER, IN "PARAGRAPH Styles in QuarkXPress" (*Publishing Workshop*, September 1996), mentions that neither QuarkXPress nor Adobe PageMaker supports character styles. You can apply a style to an entire paragraph but not to, say, a title or a person's name or an URL within a paragraph. What, they think we don't want to do this kind of thing?

Ready,Set,Go, however, lets you do character styles. Has for years, in fact—almost as long as that blond customer service rep has been taking orders for MacWarehouse.

RICHARD S. RUSSELL
Madison, Wisconsin

Macworld's *review of Ready,Set,Go 7.0.2 appeared in the September issue.—Ed.*

AOL Tips . . .

IN SEPTEMBER'S *CONSUMER ADVOCATE*, James A. Martin states that "AOL doesn't let Macintosh users delete more than one message at a time."

Using my own Mac sense, I found I could select noncontiguous messages in my mailbox by holding down the ⌘ key and clicking. I can also use click-drag or shift-click to select contiguous messages.

DAVID BILIDES
Santa Fe, New Mexico

That tip only works with America Online 3.0, not with 2.7 or earlier. Those of us not on the beta list will just have to wait.—Ed.

. . . and AOL Tricks

I AGREE WHOLEHEARTEDLY WITH THE awarding of a Turkey to America Online and its sales windows (*Consumer Advocate*, September 1996). When I wrote to AOL about this, it responded, "Many members find our offers of technology guides and consumer merchandise a wonderful opportunity to benefit more from this exciting medium." Oh, please! Where did I leave my electronic hip waders?

AOL staffers did tell me to call or write to customer service and ask that "merchandising pop-ups" be blocked. Contact customer service at 800/827-6364 or use keyword *billing*. In the billing area, choose Frequently Asked Questions, click on More, scroll to the end of the list, and click on Write to Our Staff.

But guess what—I still get the messages. A turkey indeed.

CINDY O'HORA
Conestoga, Pennsylvania

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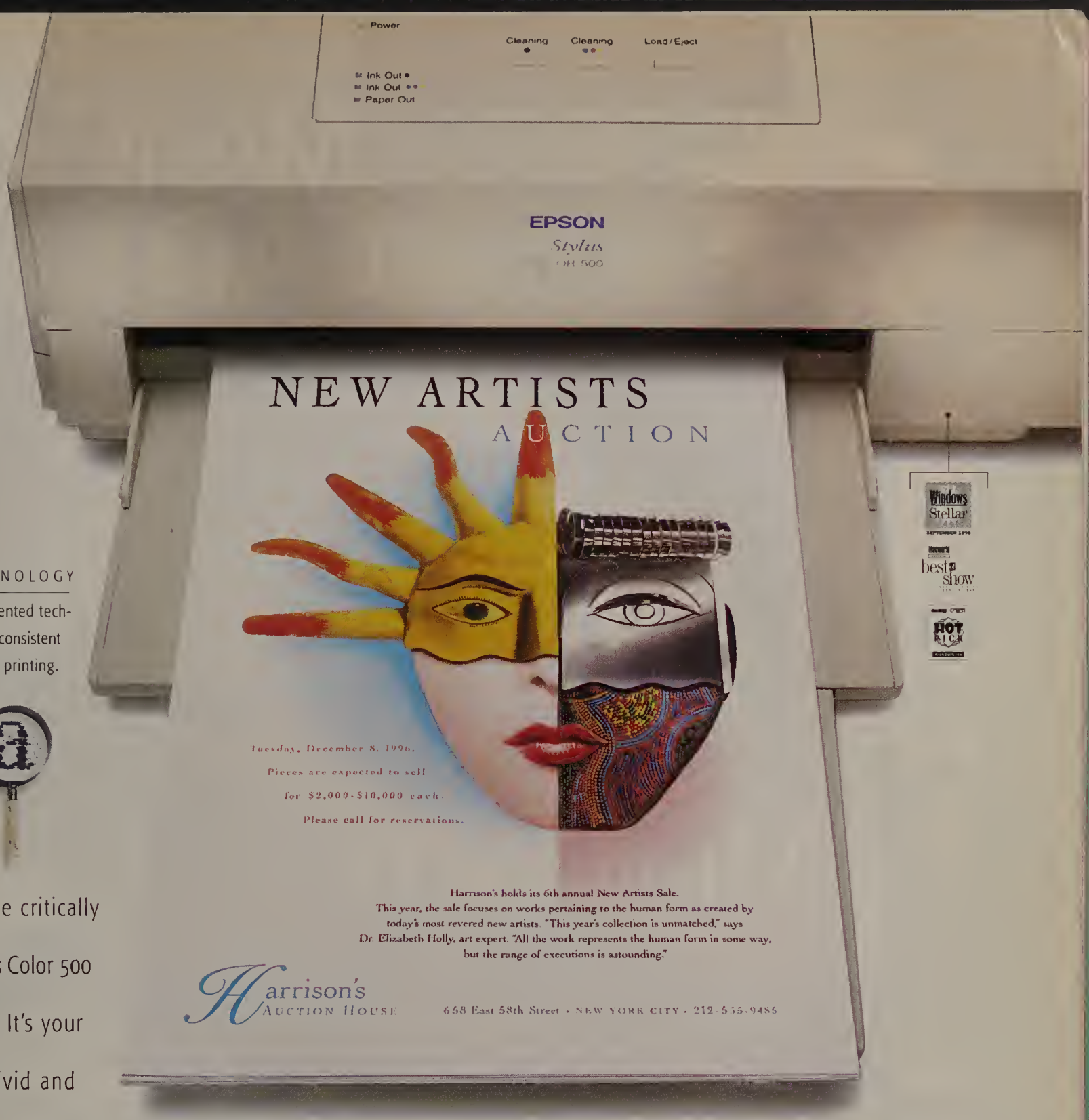

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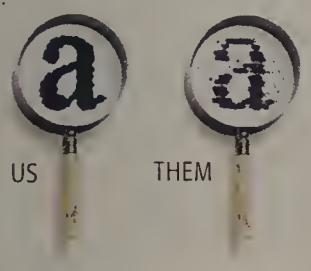

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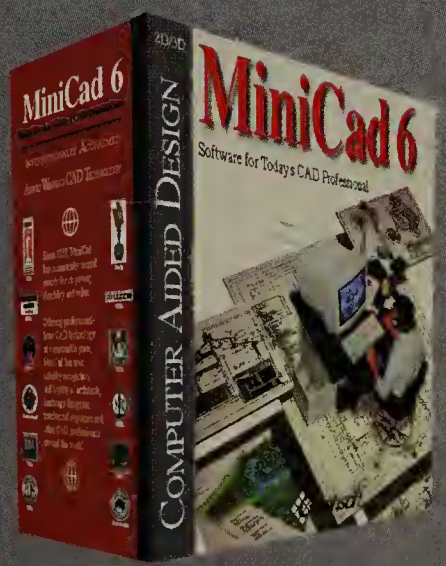

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Circle 46 on reader service card

by Adrian Mello

The Color Printing Revolution

HOW THE INTERNET AND PRINTER ADVANCES ARE DRIVING CHANGE

COLOR DEFIES OUR TENdency to take things for granted. Like hummingbirds drawn to brightly colored flowers, we're attracted to color in signs, grocery-shelf packages, multimedia presentations, and—well, you name it. Our natural preference for color is reflected in how color media inevitably displace black-and-white media. Color television, photography, movies, and monitors all forced their monochrome predecessors to step aside. But in spite of our preference for color, most of us still print black-and-white documents on monochrome laser printers. That may soon change.

Color printing is on the verge of a revolution that will dispatch monochrome printers to the same technological scrap bin occupied by black-and-white TVs and monochrome monitors. In the process we'll permanently change our expectations about what, how, when, and where we print. This change will unfold over the next three to five years, and it will be precipitated by the widespread use of color graphics, changes in color printer technology, and the Internet explosion.

Color's Bumpy Road to the Top

The transition to color printers began in the last few years as color ink-jet technology quickly replaced monochrome ink-jet technology. In 1993 monochrome ink jets accounted for about 75 percent of the ink-jet printing market, according to IDC (a research company owned by IDG, *Macworld*'s parent company). By 1995 the situation had entirely reversed as color ink jets took about 80 percent of the market. Today, color ink-jet printers dominate in homes and very small businesses. Nonetheless, color printers on the whole haven't made much headway in the general business market.

Some people argue that offices don't really need color printers because most business documents don't require color. The same kind of argument was made against monochrome laser printers. Since most people were perfectly happy printing memos and reports in Courier, everyone assumed there was no demand for anything else—that is, until the Apple LaserWriter permanently changed expectations with built-in typefaces such as Times and Helvetica that vastly improved the appearance of printed documents.

Monochrome laser printers continue to dominate offices because they are relatively inexpensive, fast, and easy to use. In order for color printers to displace monochrome printers in the workplace, vendors must first eliminate the tradeoffs

HANK OSUNA

customers currently face. Quality, speed, and cost will have to improve to the point where customers need sacrifice little for the added benefit of color.

By Ink or Laser

If monochrome laser printers set the standard, which color printer technology is the most promising challenger? Liquid ink, solid ink, and color laser are all possibilities. Liquid ink has the least expensive hardware and produces the best-quality photographs and richly graded images. The problems are that it's slow (about 2.5 pages per minute in monochrome, 0.4 ppm in color) and has the most expensive consumables, ruling it out for office use.

Solid ink is faster (about 3.8 ppm in monochrome, 2.3 ppm in color), has the least expensive consumables, and produces good-quality text and PostScript line art. But solid ink takes a long time to warm up and produces the poorest-quality photographic images, and some people don't like its glossier appearance.

Color laser is the fastest (about 7.6 ppm in monochrome, 1 ppm in color) and produces the best-quality text and good PostScript line art, but doesn't produce good photographic images.

The monochrome print speeds above can be compared with monochrome laser print speeds of about 11 ppm. (The performance figures I've quoted are derived from recent Macworld Lab tests.)

Today, color laser is the most expensive option, but some companies and analysts have said that within the next couple of years a good color laser printer will be available for less than $3000, considered the cutoff price for widespread adoption. Once prices come down, business users' positive experience with monochrome lasers may well tip the balance in favor of color laser printers.

Will the Internet Kill Print?

Some predicted that computers would create a "paperless office," but computers multiplied the amount of printed material by several times. Print's epitaph is being written again, but this time the Internet is its undoer. The Internet won't replace printing, though—it will actually be re-

continues

sponsible for more, not less, printed matter.

The Internet is great for browsing and searching, but it is terrible for reading. Most people I know prefer to print out longer Web documents and read them later. With all the information being published on the World Wide Web and on intranets, end users are going to have even more material to print out. And they are going to want to print it out in color.

Printing from the Web is still primitive, and it has largely been ignored. There's no consistent user interface for printing Web documents, and there aren't any printers that directly interpret HTML—the Web's de facto page-description language. A solution to this latter problem has appeared with Adobe's recent announcement that PostScript Level 3, arriving in mid-1997, will support HTML printing (see *News*, this issue). That means Level 3 printers will take measures to improve speed and quality when you print Web pages.

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JONES DIGITAL CENTURY

Circle 189 on reader service card

Just-in-Time, Just-in-Place Printing

The Internet will have an even bigger impact on the distribution of printed material. At present, when you want to share more than 25 to 50 color copies of a printed document, you need to use an outside service, because to do this in a fast and cost-effective way requires expensive special-purpose equipment.

The Internet and intranets might help alleviate this problem by providing access to and control of a broad array of color printing devices. With PostScript Level 3, printer manufacturers, service bureaus, and intranet managers will be able to set up specific printers, copiers, and other devices with individual Web pages so that they can be controlled over the Net. That will mean that users can directly control the printer for their own jobs, or at least it will be easier to work with whoever is directly managing the printing work, whether that's a service bureau or a company technician.

For example, you might use your company's intranet to distribute a color report to colleagues located in several different departments and locations, each with its own color printer. Or you might want to print several hundred copies of a marketing brochure for a Boston trade show. You send your documents over the Net to a service bureau you have a regular account with, and you place your order online. The bureau is part of a national network, and it forwards your job to a Boston affiliate, which prints the brochures and delivers them to your hotel when you arrive.

One problem with remote printing and distribution via the Internet is quality control. You have no guarantee that the brochures you print for Boston will match the brochures for next month's trade show in San Francisco. Perhaps this just means that Internet printing will only be used when quality considerations are flexible.

Regardless of these issues, the Internet will drive the demand for color printing, not curtail it. As we become accustomed to the delivery of up-to-the-minute information electronically, we will soon demand the same of our printed information. All that remains is the widespread availability of good low-cost color printers, easily accessible software and images, and the right network infrastructure. When these come together, the entire gamut of personal computing will be in living color. m

Dear Diary,
I'm so happy today. After years in therapy without results, I've finally found a way to deal with my old girlfriends. I discovered GOO, my realtime liquid image funware. I can smear, I can smudge, I can stretch. It's really comforting watching them take on lives of their own as animated GOOvies. All my anxieties have melted away. I sleep better now... I have to go and GOO some more. I love my new life!
With new Kai's Power Goo software, goo-ing photos from scans, digital cameras and Goo's own image library is certainly therapeutic... But we can't always guarantee the results.
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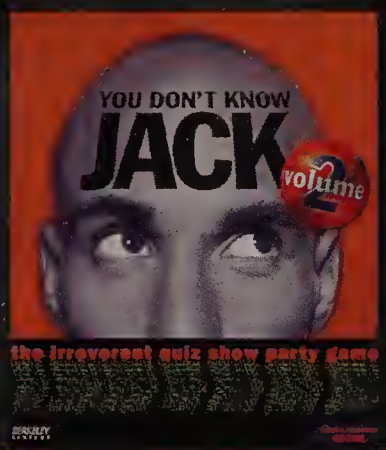
MetaTools
The Visual Computing Software Company
Circle 5 on reader service card

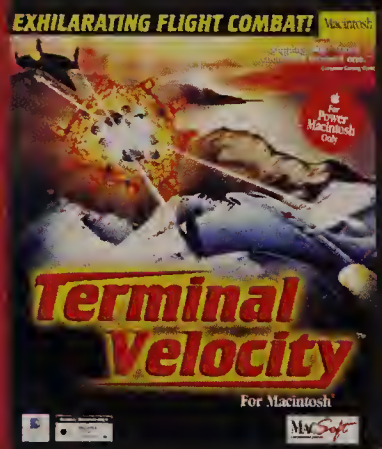
Virtual Pool from MacPlay has all the angles and shots of the real game—and then some. Features 4 great pool games, full-motion-video library, realistic physics and geometry, easy multiplayer modes, realistic 3-D perspective and graphics plus a musical jukebox.

Five hundred years ago, Europe's conquering heroes pursued dreams of a new world. MacPlay's Conquest of the New World is a strategy game where you command explorers, settlers and mercenary soldiers as they discover a new world and build the ultimate nation.

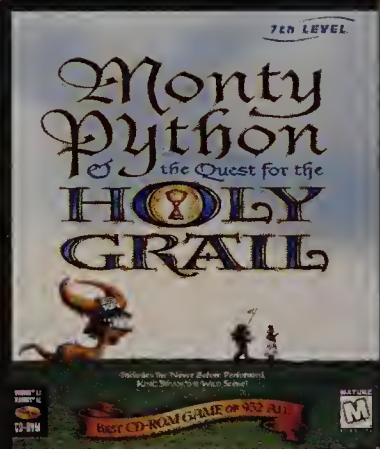
You Don't Know Jack, Volume 2, is the bilarious sequel to the original award-winning game. This Jack comes complete with 800 all-new questions, new question types, celebrity guest appearances, new features and more. From Berkeley Systems.



In Zork Nemesis, you're beckoned to the Forbidden Lands, a cursed world occupied only by the tortured spirits trapped there. Travel through 5 mind-bending worlds to discover the ancient secret of alchemy that will free the trapped souls from evil's grip. From Activision.

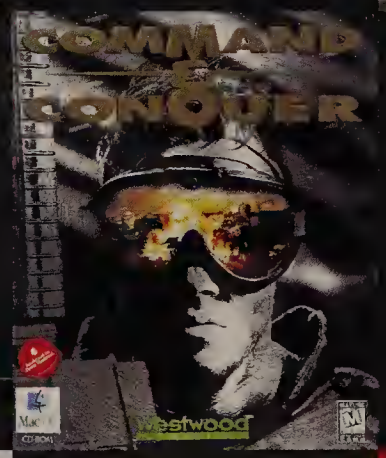


MacSoft's Terminal Velocity offers fast 3-D texture-mapped graphics, full 360-degree flight movement and 7 weapons of extraordinary destruction as you fight your way through 9 unique planets with an awesome array of air-to-air and air-to-ground combat action.



The best CD-ROM game of 932 A.D.—Monty Python and the Quest for the Holy Grail from 7th Level, Inc. It will take you on a romp through King Arthur's England, uncovering clues, solving puzzles and playing wholesome games like "Burn the Witch" and "Spank the Virgin."

Westwood Studios' Command and Conquer takes you into a gritty, high-tech world where the art of electronic intelligence and covert surveillance reigns supreme. Where guerrilla strategies and savage combat are the norm. Muster forces and lacerate your enemies to the bone.



Tank Commander by Eidos Interactive slams you into the cockpit of an M1 Abrams tank as you test your split-second-decision skills against enemy tanks in over 25 fully textured missions. Destroy T-72, Leopard and Challenger tanks with over 7 weapons.

With its incredibly realistic flight models, 3-D photo-realistic landscapes and the use of real-world physics, Flight Unlimited re-creates the most accurate sensation of aerobatic flying ever experienced on the Macintosh. For best results, play before lunch.

Origin Systems' Wing Commander IV is one of the latest space-combat games for the Mac. Take on the role of Colonel Blair, played by Mark Hamill in breathtaking space battles and heart-pounding drama, as you fight your way through the most spectacular Wing Commander yet.

Get ready for the biggest adrenaline rush of the holiday season. We're talking new games for the Mac.® We're also talking sweaty palms. Heart-pounding exhilaration. Stomach-in-the-throat thrills—the works. And here's the best part: with thousands of titles to choose from, you may never come down from that gaming high. Piqued your interest? Good.

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mell of chestnuts burning? Or just your neurological receptors going into overdrive?

Mac OS

So now you're probably wondering how to get your twitching fingers on these games. Just visit stores like CompUSA, Staples, Micro Center and Fry's Electronics. Or, flip through any Mac mail-order catalogs. Or, hop on the Net. But no matter where you go to find them, remember to look for the smiling Mac OS logo. (All great software wears this face.™) If you're ready to take your adrenal glands on the ultimate ride, visit www.macsoftware.apple.com. And learn more about games for your Macintosh® and how to find them. Of course, if you want to, you can always use a phone: **call 800-500-4862**.

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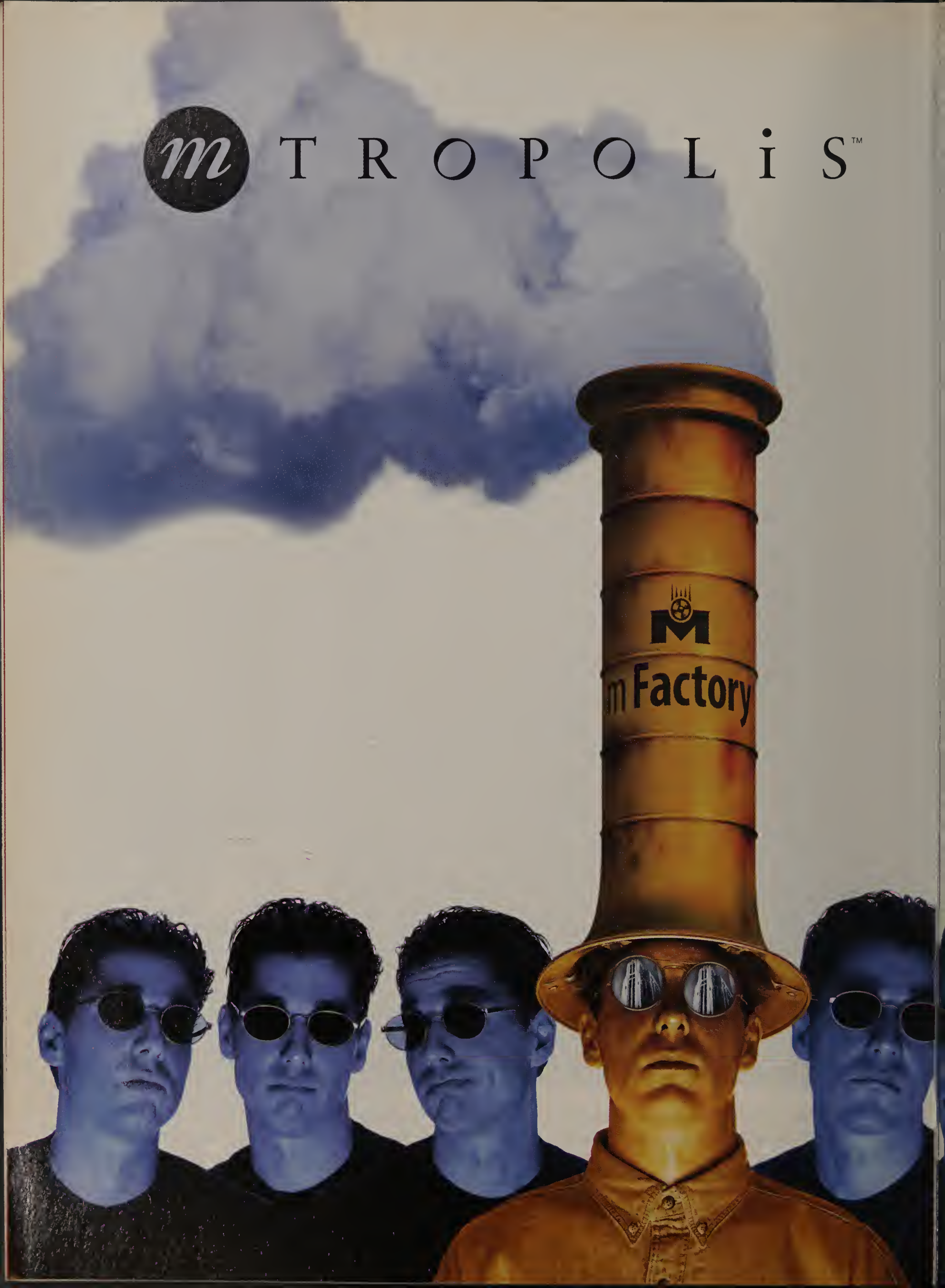

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Circle 4 on reader service card

News

MACWORLD EXCLUSIVE

New Apple Systems on the Horizon

INTERNAL DOCUMENTS OUTLINE ROLLOUTS THROUGH MID-1997

by Macworld Staff

JOHN RITTER

Apple Computer (408/996-1010, *http://www.info.apple.com*), finally competing in a market where it is not the only Mac systems vendor, plans a series of rollouts during the next several months that will move its entire product line to faster versions of the PowerPC chip.

You can also expect new multiprocessing systems, a new chassis design for high-end Macintosh models, and an architecture that makes it easier and cheaper to upgrade to faster CPUs, according to internal Apple documents obtained by *Macworld*.

Those documents also describe forthcoming displays (see "New Apple Displays: Syrah, Warrior, and Whaler," elsewhere in *News*), PDAs (see "Newton: New CPU, New Mission"), and network servers (see "New Servers: Speed and Pretty Pictures"). Apple would not confirm this information, and because the products are under development, it's possible that some details will change before they become available.

High-End Macs

At the high end, Apple plans to replace its Power Macintosh 7200, 7600, 8500, and 9500 with a series of single-processor and multiprocessor (MP) machines, code-named Montana, all based on the PowerPC 604e. Although the systems will be faster across the board, they will be targeted at the same markets as the models they replace: high-end graphics users for the 8500 and 9500; business users for the 7200, 7600, and new 7300. Slated for a February 1997 rollout, the Montana systems will feature upgradable CPU boards, in anticipation of even-faster PowerPC chips that should be available over the next year or so.

The top-of-the-line Montana 9500 and 9500 MP will offer CPU speeds of 225MHz or 250MHz, replacing the current 9500 with its single-processor 200MHz 604e and dual-processor 180MHz 604e.

The Montana 8500 and 8500 MP—the first multiprocessor version of the 8500—will feature 200MHz or 225MHz 604e CPUs.

The systems will be

housed in a new tower chassis, code-named K2, that will feature four 5.25-inch drive bays, three 3.5-inch bays, a 390-watt power supply, an enclosure-locking mechanism, and room to accommodate three- or six-slot boards.

The box is designed for easy access to system components, using an approach similar to the case design in the current Power Mac 7200 and 7600, where you can swing out the power supply and slot-bay covers to add memory and boards.

Three new desktop machines will replace the Power Mac 7200 and 7600. The 7200, currently running a 120MHz 601, will get an as-yet-unspecified speed bump. The new Montana 7600 will feature a 604e CPU running at 180MHz or 200MHz. Like the current 7600, it will feature a video-in port.

The third model, the Montana 7300, will drop the video port and run a 166MHz 604e. The 7200 and 7300 will be Apple's entry-level business machines.

Consumer Models

Apple also has big plans for its consumer-oriented Performa series. By the end of this year, the company will offer new configurations for its recently announced Performa 6400 tower, along with upgrades to the Performa 6320CD, 5400, and 5260. All will feature 8× CD-ROM drives. Then, around February 1997, Apple will unleash a new series of consumer machines, including its first to incorporate elements of the Common Hardware Reference Platform (CHRP).

Replacing the 6320CD at year's end will be the Performa 6360—code-named Elixir—a desktop model that will feature a 160MHz 603e CPU, an 8× CD-ROM drive,

continues on page 44

MACWORLD EXCLUSIVE

Newton: New CPU, New Mission

APPLE TO PACKAGE PDAS FOR TARGETED MARKETS

by Macworld Staff

Apple will take another shot at establishing its Newton technology when it unveils new personal digital assistants (PDAs) early next year. The PDAs will take advantage of power-efficient 32-bit RISC CPUs from Digital Equipment Corporation (DEC), along with a new marketing strategy that targets users with specialized data-collection needs. The PDAs will come on the heels of Microsoft's introduction of Windows CE, a new Windows variation designed for handheld computers and other digital appliances.

Newton and Shay

Information about the forthcoming PDAs comes from internal Apple documents obtained by *Macworld*, which outline plans for two products: a next-generation Newton MessagePad, code-named N2, and a handheld machine, code-named Shay, aimed at the education market. Apple's plans for these products could change before the new Newtons are actually released.

The N2 will be built around the SA-110 StrongARM microprocessor, a 32-bit, 160MHz CPU developed by Advanced RISC Microprocessors (ARM) and DEC. The CPU's big selling point is its low power consumption; AA batteries can power machines based on the StrongARM. Apple believes it can offer a tenfold performance boost over the current MessagePad.

Other features will include 8MB of read-only memory; 5MB of RAM; a 480-by-320-pixel, 16-gray-level LCD display; a Newton InterConnect Port; and an internal serial slot. The N2 will ship with built-in word processor, spreadsheet, Web browser, PIM, and E-mail applications. Optional peripherals will include a keyboard, AC adapter, rechargeable battery, and Mac-to-Windows connection utilities. Scheduled to ship in the first quarter of 1997, it will sell for $1000 to $1200, depending on the configuration.

Beyond offering new hardware and software, Apple plans new positioning for the PDA. Instead of targeting the product at consumers or general business applications, Apple has identified markets that can take particular advantage of mobile computing, such as health-care professionals, salespeople, and scientists. Unlike consumers, these groups might be willing to pay $1000 for a device that helps them work more efficiently. Apple also hopes that the growth of the Internet and general networking applications will create critical mass for the acceptance of PDAs.

Shay Goes to School

The Shay will use the ARM 710a chip, a 32-bit CPU running at 25MHz. Targeted at the education market to complement costlier Macintosh systems, the Shay will feature 3MB of RAM; a 480-by-320-pixel, 8-gray-level LCD; and a subnotebook keyboard. It will be powered by four AA batteries.

Schools will be able to purchase the machines for $800 each, with packs of eight also available. Apple hopes to ship the machine by mid-1997; expect it to show up in the classroom by next fall. Apple is investigating the possibility of offering a retail version as well.

continues

Apple's Rollout Plans

1996		1997	
Fourth quarter	First quarter	Second quarter	Third quarter
• Syrah 15-inch display • Performa upgrades (5260, 5400, 6360, 6400)	• N2 personal digital assistant • Apple Webmaster • New high-end Macs (Montana) • New Performas (Gazelle, Tanzania) • Circus server	• Whaler 20-inch display • Warrior 17-inch display • Shay personal digital assistant	• CHRP servers

Apple's product plans include new displays, personal digital assistants, and Macintosh systems for the professional and consumer markets. This information is based on internal Apple documents obtained by *Macworld* and is subject to change.

JOHN BLECK

Apple is clearly concerned about Windows CE. On September 16, when Microsoft announced the software, Apple held a telephone press conference to discuss its own PDA strategy. But instead of providing a glimpse of future products or technologies, Jim Groff, senior vice president and general manager of Apple's Information Appliance Division, merely discussed why he considered Apple's PDA approach superior to Microsoft's.

Microsoft, he stated, is taking a software environment "optimized for the desktop and shrinking it down to handheld devices." This approach, he said, "does not yield products that are compelling for users." Only time will tell if Apple's approach is any better.

MACWORLD EXCLUSIVE

New Servers: Speed and Pretty Pictures

NETWORK SERVERS RIDE POWERPC JUICE

by Cameron Crotty

While the computing world plays armchair quarterback with the future of the Macintosh Operating System, Apple is riding the coattails of PowerPC performance increases, and working to bring its QuickTime media technology to the Internet.

A Projector in Your Pocket

SUPPORTS RESOLUTIONS UP TO 1280 BY 1024 PIXELS

OK, it's not quite that small, but the 11-pound LightBook, the newest LCD projector from Proxima (619/457-5500, *http://www.prxm.com*), can certainly fit into a PowerBook-size case.

Designed for mobile professionals who must cart their presentations from site to site and settle for less-than-ideal conditions, the LightBook sports a rugged exterior; a bright display; a simple setup that automatically adjusts for hardware type (Mac or PC), image size (4 to 14 feet diagonal), and resolution (640 by 480 or 600 by 800); and a remote control that lets you flexibly maneuver through a presentation.

SUZANNE ROADY

The off-axis optical system projects upward to prevent cut-off images, while keystone correction eliminates distortion caused by tilting the projector. And the LightBook's autoswitching power supply means no special adapters are needed for international use. Audio-video support includes NTSC, PAL, SECAM, and S-Video, plus built-in stereo speakers with stereo input for computer and video and line-level output for external speakers. Due to ship in mid-October, the LightBook will retail for $4999.—CATHY ABES

Apple's Big Iron

Apple (408/996-1010, *www.info.apple.com*) has announced a pair of new Network Servers that run AIX, IBM's version of Unix. The 200MHz PowerPC 604e drives the Network Server 700/200 ($16,129 with 48MB of memory, two 4GB Fast/Wide SCSI-2 drives, and an 8× CD-ROM drive).

The Network Server 700/SMP, expected to be available by February 1997, introduces symmetric multiprocessing (SMP) to the line. It ships with two 200MHz 604e CPUs, each with 1MB of cache. Apple will offer single-processor ($1609, shipping in November) and SMP upgrade cards (pricing and availability not announced) for current Network Server 500 and 700 owners.

Near next summer, Apple is looking to migrate the Network Servers to CHRP technology and make other operating systems available, including Microsoft Windows NT, Sun Solaris, and the Macintosh OS.

The 200MHz PowerPC 604e also appears in the Workgroup Server: the 8550/200 ($5799 to $6559 depending on software), an upgrade that encompasses the CPU speed bump, an 8× CD-ROM drive, and more standard RAM (32MB).

Server aficionados won't have to wait long for another speed increase. According to internal Apple documents obtained by *Macworld*, a server code-named Circus, based on the Montana desktop CPU, will use chips in the 250MHz range. See "New Apple Systems on the Horizon," elsewhere in *News*, for further details on the Montana machines.

Why the attraction to the big iron? The answer, my friend, is blowing in the bottom line. According to the internal Apple documents, the Workgroup and Network Server lines provide profit margins of about 40 percent.

Software (Media, Media, Media)

Over the next six to nine months, Apple will work to follow through on its stated strategy of bringing the QuickTime media layer to the Internet. According to company documents, Apple is building a Java media library that will make QuickTime technologies easily available to Java programmers. Apple intends to announce the libraries—code-named Biscotti—at Macworld Expo in January, although there was no word on availability. At roughly the same time, Apple plans to formally announce SPIDI, a technology previewed at Macworld Expo in Boston that provides streaming speech over the Internet.

Apple's client and server software song for the coming months is a familiar one. The company will rely on the Apple Internet Connection Kit (AICK) and Cyberdog, with new versions of the latter expected in January 1997 and again in March 1997, although there is as yet no word on the expected feature set. Netscape has committed to building a Cyberdog-compatible version of the Navigator browser, but again there is no word on the delivery date.

On the server side, Apple will continue to ship the Apple Internet Server Solution (AISS), a package of applications from third-party developers. However, in January 1997, the company plans to introduce the Apple Webmaster Series: packages of templates, tutorials, and Apple Guides aimed at the commercial, authoring, and intranet markets. By May 1997, Apple also expects to release FutureShare, the next version of AppleShare. Fu-

turcShare will run IP networks and is expected to serve the full set of Internet protocols, including HTTP, FTP, and SMTP/POP3 mail.

Apple is still battling tactical problems, but its Internet strategy appears sound. As a high-end Internet server, the Mac still labors under problems born of the operating system, but the Workgroup Server 8550 is more than enough machine for 80 percent of the sites on the Internet, and is still far easier to get up and running than any competing server. On the client side, Cyberdog remains more an interesting technology demo than useful software, but an OpenDoc version of Navigator should help shore up that front. Apple may not change the world on the Internet, but it might be able to carve out a place to live.

systems

MP Software Takes Off

NEW MULTIPROCESSING APPLICATIONS WILL BE BORN TO RUN

by Charles Seiter

Granted, you don't need four processors blazing away at 200MHz for word processing—even in Word 6—but until recently the list of multiprocessing-capable (MP) software for the Mac almost began and ended with Adobe products. Easily 90 percent of multiprocessing work centered on MP-adapted Photoshop plug-ins or Adobe After Effects. Now, with the beta release of Metrowerks' CodeWarrior 11, things are finally speeding up for multiprocessing on the Mac, particularly in the high-end 3-D markets where compute-intensive tasks demand that kind of power.

DayStar Digital (770/967-2077, *http://www.daystar.com*) pioneered multiprocessing on the Mac with its Genesis MP series. Now MP systems from other vendors, such as the Umax SuperMac S900L 604/180DP and the Apple Power Macintosh 9500/180MP (both using technology licensed from DayStar), will provide a hardware base large enough to make MP software development attractive in the areas of rendering and animation.

QuickDraw 3D Goes MP

So far, the big news for 3-D users is Apple's release of QuickDraw 3D 1.5, which supports multiprocessing. Besides boosting speeds in Adobe Premiere and other popular Adobe products, multiprocessing QuickDraw 3D will help Strata's $1495 Studio Pro (801/628-5218, *http://www.strata3d.com*) and Electric Image's $7495 Electric Image Animation System (818/577-1627, *http://www.electricimage.com*) strengthen their claims in Hollywood, a Mac stronghold that lately has been under siege by NT-based systems.

Macromedia's KeyGrip (415/252-2000, *http://www.macromedia.com*), a forthcoming video-editing product developed by former members of the Premiere programming team, will exploit QuickDraw 3D multiprocessing in detail so that the processing speed for 3-D effects is truly proportional to the number of processors.

Leapfrogging Intel

With MP capability and some ingenuity, Macintosh developers should be able to keep one jump ahead of developers working with Intel's MMX instruction-set extensions, which so far have improved speed only by a factor of two and only for certain applications.

Other applications that could benefit from multiprocessing, notably CAD (MiniCAD and TurboCAD), large database programs (4th Dimension), and math packages (MATLAB, Mathematica, and Maple), are likely to wait for the January shipment of release 11 of the Mac development standard, Metrowerks CodeWarrior. Although Metrowerks has recognized some aspects of multiprocessing since CodeWarrior release 9, MP has mostly appeared in the Integrated Development Environment (IDE) as a way to let C++ programmers speed up the debugging and compilation of large programs. CodeWarrior 11 will add an MP-aware profiler and an MP compilation flag in the IDE, enabling developers to build MP-aware versions of their programs with minimal effort.

The prerelease version of CodeWarrior 11 is in the hands of key developers now, so most of DayStar's long laundry list (*http://www.daystar.com/Superfast.Apps/Aps.html*) of graphics, animation, and rendering applications that have announced MP versions will be shipping by Christmas.

MACWORLD EXCLUSIVE

New Apple Displays: Syrah, Warrior, and Whaler

15-, 17-, AND 20-INCH MONITORS IN THE WORKS

by Macworld Staff

During the next few months, Apple plans to introduce a trio of color displays, including a 20-inch model with built-in calibration functions. Slated for a November release is an under-$500, 15-inch monitor, code-named Syrah, that will replace Apple's Multiple Scan 15. Featuring built-in stereo speakers, the display will handle resolutions up to 1024 by 768, although it's hard to imagine why anyone would want such high resolution on a 15-inch screen (standard resolution is 832 by 624). In April 1997, Apple will introduce the Warrior EZ, a 17-inch, 1280-by-1024 display, and the Whaler, a 20-inch, 1600-by-1200 monitor. Again, the higher resolutions may be overkill for most users, and you'll probably need a high-end display adapter to see the extra pixels. The Warrior, which replaces the AppleVision 1710, will be available in a base version for $950 and an AV version—including speakers and microphone—for $1050. The Whaler, replacing the MS 20/B, will be priced at $1800 for the base version and $1950 for an AV version. The Whaler will feature built-in automatic calibration and compensation for phosphor aging and room lighting.

JOHN BLECK

Special REPORT

Better Graphics for the Internet

NEW TECHNOLOGIES TRANSFORM THE WEB INTO A PICTURE-FRIENDLY ENVIRONMENT

Thanks to the World Wide Web, the Internet has transcended its origins as a text-based information network to become a new medium for graphic communication. However, designers have been forced to work around the Web's limitations in displaying and printing images. In this special report, we examine the efforts of Kodak, Adobe, and others to make the Web a friendlier place for graphics.

FlashPix Format Gains Momentum

by Stephen Beale

Printing documents from the Internet is easy; printing good-looking, professionally designed documents is not. The problem is twofold: true typography on the Internet is nearly nonexistent, and images on screen lack the resolution needed for quality printed output. For typography, we'll have to wait for Microsoft and Adobe to finalize their unified OpenType format (see "One Format for Print and Web Fonts," *News*, September 1996). However, a solution for the imaging side is here in the form of FlashPix, a new graphics file format developed by Microsoft, Live Picture, Hewlett-Packard, and Eastman Kodak. Netscape has announced support for the format, and any time Netscape and Microsoft agree on something these days, you know it's bound to become a standard.

The companies behind the format announced it June 3 at the spring Comdex in Chicago. But FlashPix became a reality at the recent Seybold San Francisco conference. Live Picture and Microsoft announced consumer-level image-editing products that take advantage of the format, and Hewlett-Packard and Live Picture demonstrated its potential use on the Internet. Live Picture's software, LivePix, is available for Macintosh and Windows, while Microsoft's Picture It is (surprise!) Windows only. Kodak owns the format specification, but will make it available to any interested developer.

Unique Properties

FlashPix has unique properties that make it ideal for displaying images on the Internet and then printing them on a local output device. Based in part on the IVUE format in Live Picture's graphics software, FlashPix incorporates multiple-resolution versions of the image, with each version having half as many horizontal and vertical pixels as the preceding version. For example, if you begin with an image measuring 1280 by 960 pixels, the format includes versions measuring 640 by 480, 320 by 240, 160 by 120, 80 by 60, and 40 by 30. Each version of the image is further divided into tiles measuring 64 pixels square. As you zoom in and out of the image, the graphics software selects the appropriate resolution and tiles for your screen display, eliminating the need to rebuild the image each time you change views. Any changes to the image are recorded in a script that's part of the file, but separate from the image itself. You can thus work with a low-resolution version of the image and have the changes applied to the other versions.

At Seybold, Hewlett-Packard and Live Picture demonstrated a FlashPix-based technology called Imaging for Internet that uses a browser plug-in and server module as its main components. When browsing a Web page that includes a FlashPix image, you'll see a version of the image suitable for screen display. If you want to print the Web page, the server module will send additional information needed to produce it at a resolution appropriate for your printer.

Product Possibilities

Vendors are lining up to offer products that take advantage of the FlashPix technology. Kodak envisions Internet-based photo libraries and photo-processing services, and is counting on FlashPix to be a "killer app" that inspires masses of consumers to discover digital imaging. One advantage of FlashPix is that it allows images to be manipulated on consumer-level systems with limited memory. Both LivePix and Picture It are aimed squarely at the consumer market with under-$100 price tags.

If FlashPix takes off the way its developers expect, Live Picture could be the big winner. Its previous image-editing software was built around a format similar to FlashPix, and the new LivePix package supports FlashPix directly. Adobe, Macromedia, and Fractal Design can easily add the ability to read and write FlashPix files, but taking full advantage of the format won't be so easy.

Nevertheless, FlashPix solves some real problems, and has enough backing from industry heavyweights to supplant GIF and JPEG as the dominant image format on the World Wide Web.

PostScript Level 3 Adds Web Features

by Stephen Beale

As the World Wide Web emerges as a new communication medium, Adobe Systems (415/961-4400, *http://www.adobe.com*) is struggling mightily to ensure that it doesn't get left behind in the rush to cyberspace. The company has positioned the Acrobat PDF format as an alterna-

ILLUSTRATIONS BY JOHN BLECK

tive to HTML for document display. It acquired a program called PageMill that became the first layout-oriented tool for creating Web pages. It has added Web publishing features to PageMaker, Photoshop, and Persuasion. And now, with the announcement of PostScript Level 3, Adobe will let printer manufacturers tie their products more closely to the Web.

Two-Way Internet Support

PostScript Level 3 adds Internet support in two directions. It will make it easier for printers to produce documents that originate on the Web, and it will also allow you to use the Web as a gigantic printing network. For the first time, PostScript printers will be able to process HTML and PDF documents directly. PostScript interpreters will be able to identify the components of a page—whether or not it originates on the Internet—and process those elements using methods unique to each. For example, if a page includes a TIFF file and an EPS vector graphic, the interpreter will apply different processing methods to each element, designed to optimize its quality and throughput. Special functions for processing 3-D images will also be included.

Perhaps the most exciting prospects lie on the print-management side. PostScript Level 3 adds the ability to control a printer using standard Internet protocols. Manufacturers will have the option of offering a Web page for each output device. You'll thus be able to print documents and otherwise control the printer through a Web browser.

Distribute-Then-Print

Suppose you have a flyer you need distributed to multiple, geographically dispersed locations of your company. Using a corporate intranet, you'll be able to print from PostScript Level 3 devices in each location. Such "distribute-then-print" scenarios are becoming increasingly popular, but currently require proprietary networks. PostScript Level 3 opens this capability to the Internet.

Conceivably, a service bureau could put up a Web page providing password-protected access to selected output devices. You've heard of self-serve copiers—how about a self-serve imagesetter or digital press? Of course, most service bureaus would be loath to permit such access to their output devices, since many customers still don't know how to prepare a file properly. But tools are emerging that automatically clean up PostScript files and direct them through a production workflow. Even without such tools, some service bureaus might be willing to allow their most trusted customers to work directly with their hardware.

Other notable features in PostScript Level 3 include PlanetReady Printing, which makes it easier for vendors to

customize their printers for different languages, and an extended set of fonts that can reside in the printer. Adobe hasn't provided many details on the latter feature, but it's a safe bet that it involves the font-compression technology in Ares Software's Font Chameleon. When Adobe acquired Ares earlier this year, Adobe said it would offer the FontChameleon technology to its PostScript licensees.

systems

First Mac for Just $1400

APS TECHNOLOGIES AND AKIA JOIN RANKS OF CLONE VENDORS

by Howard Baldwin

The Mac clone market continues to heat up with the announcement of two new licensees for the Mac OS, one of them planning to offer the lowest-priced system yet seen in the market.

APS Technologies (816/483-1600, *http://www.apstech.com*), known best as a Macintosh storage vendor, has announced new clone systems with prices starting at $1399. Meanwhile, Akia (*http://www.akia.com*) has announced that it will offer Mac OS–based laptops and desktop machines for the Japanese market by the end of the year.

Motorola Motherboards

Set to ship November 5, APS's systems, using Motorola motherboards, will be assembled in a Kansas City facility and sold direct, according to Paul Mandel, APS Technologies president. "We will have off-the-shelf systems that are popular configurations, so that if you have to have a machine tomorrow, you can," he says.

Otherwise, Mandel says, machines will be built to order—in the same way that Gateway and Dell build PCs for their customers—with a turnaround time of three to seven days.

APS has announced three basic systems. Both desktop systems, the $1399, 160MHz 603e-based MPower 603e160 and the $1599, 200MHz 603e-based MPower 603e200 will have 16MB of RAM, a 1.2GB hard drive, two 5.25-inch internal bays, three 3.5-inch internal bays, and three PCI expansion slots.

The closest models in price are Umax's SuperMac C600/160, at $1700, and its SuperMac C500/140, at $1500. Both Umax models are expected to ship in late October, and while they compare closely to the low-end APS configurations, they have slower processors and less expandability.

The highest-priced offering from APS is the $2599, 200MHz 604e-based MPower 604e200. The minitower system will have 24MB of RAM, a 2.5GB hard drive, 1MB of cache, three 5.25-inch internal bays, four 3.5-inch internal bays, and five PCI slots. All of the systems have an 8× CD-ROM drive, a one-year warranty, and ports for both Mac and PC peripherals.

Manufacturing Constraints

Although APS initially will be constrained in terms of manufacturing capacity—both because of its own ramp-up and because of limited motherboard supply from Motorola—Mandel estimates an average run rate of 10,000 machines per month throughout 1997.

Mandel believes that Motorola's longtime reputation for quality will draw and keep customers. Because of low profit margins, he says, the quality must be inherent. "If it comes back and you have to fix it, you lose all your money. We've already seen [PC] clone makers come in and make the same mistakes by buying the cheapest components they possibly could."

Because the APS systems use Motorola's motherboards, they have the same advantages and limits as Motorola's StarMax systems.

APS did not have prototype systems available, but

continues

performance should be the same as or very close to that of comparable StarMax models.

Akia Enters the Fray

The new Akia systems are unusual in that the desktop Macs, like the laptops, will feature LCD flat-panel displays instead of cathode-ray tube (CRT) monitors. Next year Akia expects to release a computer based on the Common Hardware Reference Platform that can run several operating systems, including Windows NT, Solaris, AIX, and the Mac OS. The company has been selling PCs in Japan since November 1995; it may branch out to sell Macs and PCs outside Japan, but it has offered no expansion timetable.

Akia is the first Mac OS sublicensee for IBM, which can offer a PowerPC CPU/Mac OS bundle thanks to a May 1996 agreement with Apple. Prior to that, each prospective clone maker needed to purchase its PowerPC chips from Big Blue or Motorola, then license the Mac OS separately from Apple.

Additional reporting by ROB GUTH and CHARLES PILLER.

systems

The Battery Time Bomb

HOW TO TELL IF YOUR MAC'S MOTHERBOARD BATTERY IS DYING

by Cary Lu

Your Mac appears to be dead, refusing to start up. Or you hear a bong and then nothing—the screen remains blank. If your Mac is more than three or four years old, these could be signs that the one perishable component in it—the lithium battery on your motherboard—is about to die a natural death.

Other symptoms: the Mac lights up but you see only a flashing question mark (and you're sure the hard drive is not the culprit); your Mac forgets its date and time, reverting back to 1904 or 1956; it comes up in black and white rather than color; or your PowerBook has trouble starting with a good battery.

Because the problem can manifest itself in so many different ways, even Apple dealers often misdiagnose it, sometimes charging up to $100 for what ends up being nothing more than a simple battery swap.

Can you change the battery yourself? Yes, but only if you know what you're doing and your model has an easily accessible battery. To find out, remove the cover and look for the battery. In most desktop Macs it's a half-AA–size 3.6V lithium cell (Eveready 523-BP, Duracell PX-21), but some early Macs have the same battery soldered in with leads (pigtails), and a few recent desktop Macs use a larger 4.5V alkaline battery (Rayovac 840). Not all dealers are willing to sell replacement batteries, but those that do typically charge $15; battery distributors in the larger cities charge about $7.

If you do replace it yourself, observe polarity or else

continues

Internet WATCH

BY CAMERON CROTTY

Sun Shines on Apple

Intranets may be based on open protocols, but the big software players still want to lock up the enterprise from the back room to the front office. Sun Microsystems (415/960-1300, *http://www.sun.com*) and Apple (408/996-1010, *http://www.apple.com*) recently announced that they would build a "seamless bridge" between Macintosh desktop clients and Sun's Solaris enterprise servers. The companies' goals are to allow IS managers to administer Sun and Apple machines using the same software tools, and to build in seamless, peer-to-peer connections between the two platforms. The agreement could give Apple a stronger toehold in the large-scale–enterprise market, while offering Sun better connections to a widely accepted desktop client machine. Sun and Apple also agreed to make Sun's Java Beans and Apple's OpenDoc technologies work together. Further, Sun said that it would enhance its Java Media libraries to support QuickTime.

RealAudio 3.0 Screams Stereo Streams

Like a radio station overpowering the static as you drive closer to the city, streaming audio on the Internet is getting clearer and louder. RealAudio 3.0 from Progressive Networks (*http://www.realaudio.com*) delivers stereo sound over a 28.8-Kbps modem connection and offers high-quality audio over single- and dual-line ISDN connections. Version 3.0 is an update of Progressive Networks' server, client, and encoding software, all of which work together to support the new features. The new client-server software team is more robust and more versatile, resending dropped packets and negotiating the appropriate bandwidth (from 14.4 Kbps to dual ISDN). The RealAudio 3.0 server now also supports Internet protocol multicasting, for more efficient distribution of audio programs. RealAudio's Player Plus ($29.95) sports a new feature called PerfectPlay, with which users can hear higher-fidelity sound over slower connections; Player Plus downloads and caches the hi-fi files before playing them. Webmasters who want to serve limited amounts of audio but don't want to install a dedicated RealAudio server can use version 3.0 of RealAudio Encoder to create "pseudo-streaming" files, which can be served from a standard Web (HTTP) server. Beta versions of RealAudio Player 3.0, Player Plus, and RealAudio Encoder 3.0 are available from Progressive Networks' Web site.

JOHN BLECK

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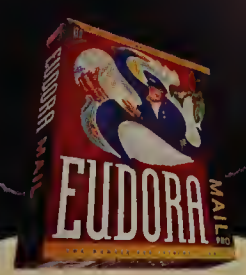

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Circle 22 on reader service card

the battery may explode! If you can't easily find the battery or there's not enough space to pry off the black plastic battery cover, you should probably take your computer to a service center. Batteries in a compact Mac with a monochrome screen and in PowerBooks (except for the 100) are difficult to replace.

online

A Web Server of Your Own

NEW PRODUCTS ENABLE PERSONAL PUBLISHING ON THE INTERNET

by Tom Negrino

Until recently, publishing Web pages took dedicated hardware, high-performance server software, and a fair amount of expertise. All that's changing with the new breed of personal Web servers. Designed to run unobtrusively in the background on a desktop machine while it's being used for regular work, rather than as the primary application on a dedicated Macintosh, a personal Web server, with its simple interface, takes very little time to set up and uses considerably fewer system resources than a high-powered server—typically requiring less than a megabyte of RAM.

The price for this frugality is that these personal Web servers can provide pages to only a few simultaneous users, instead of the dozens that regular Web servers can handle at one time.

As with regular Web servers, you'll need a dedicated connection to the Internet if you want the world to access your pages. Since most home users don't yet have such dedicated links, personal servers are currently intended for corporate and business users who want to publish documents to coworkers on the company's LAN or intranet. For example, you could make a departmental to-do list available as a Web page with hot links to detailed information on each task. Of course, if the company has a gateway between the LAN and the Internet, anyone could access the server. For security concerns, these products typically use the Mac OS's Users & Groups control panel to set passwords for access to documents and folders.

Small-office/home-office users who have dedicated access can also use personal servers as inexpensive starter servers. As the business expands—and server hit counts mount—it's easy to move the personal server's contents to a more robust dedicated server.

Today's Personal Servers

ResNova (714/379-9000, *http://www.resnova.com*) has released the $39 Web for One, with advanced features such as support for image maps, server-side includes, and automatic forms processing.

It also supports CGIs and ACGIs (Advanced Common Gateway Interfaces), allowing end users and third parties to extend the server's functionality. The server converts text documents into HTML on the fly, so publishing a document on the Web is as easy as dropping it into the server's folder. The program allows you to make files available for downloading, and it automatically BinHex-encodes files for transmission. You can download a seven-day demo of Web for One from ResNova's Web site.

At press time, a beta version of Personal WebStar was available for downloading from the StarNine division of Quarterdeck (510/649-4949, *http://www.starnine.com*).

Essentially a stripped-down version of WebStar, the product can handle only a few simultaneous users and lacks such WebStar features as user logging and sophisticated CGI handling. Personal WebStar does support WebStar plug-ins, so many third-party extensions will work. Like Web for One, Personal WebStar has drag-and-drop text-to-HTML conversion. Quarterdeck has announced that Personal WebStar will be the successor to its shareware MacHTTP server, with a shareware license fee of $49.

Apple's Coming

Apple's personal Web server entry is still waiting in the wings. According to sources, Apple has made a deal with Maxum Development (708/830-1113, *http://www.maxum.com*) to incorporate a new version of Maxum's RushHour server into the next scheduled release of the Macintosh OS. Known for its high performance, RushHour caches pages in RAM so they can be delivered quickly, without being read from disk. Apple and Maxum declined to comment on the agreement.

One of the key benefits of the Internet is that it enables people to access information more easily, unfiltered by commentators and editors. Personal Web servers remove another barrier to communication by giving you an inexpensive way to distribute your message to the whole world.

publishing

Seybold Show's Split Personality

INTERNET PROVIDES THE SIZZLE; PRINT, THE STEAK

by Stephen Beale

To see how far Apple has fallen, you had only to go to the recent Seybold San Francisco show where, for the first time in memory, an Apple representative was not part of the keynote session at the premier event for electronic publishing. Instead, the kickoff featured Marc Andreessen of Netscape and Brad Chase of Microsoft presenting their companies' respective visions for Internet publishing. As moderator Jonathan Seybold put it, Netscape and Microsoft "clearly provide the focus for where this industry is going. Standards are being driven by these two companies."

Microsoft on the Defensive

The news for Apple was not all bad. Chase quickly discovered that he was in a room full of Macintosh users—the show's audience largely consists of print publishing professionals—and found himself on the defensive as he confessed to Windows' poor color-management and scanner support. Microsoft was late, he admitted, in offering a workable environment for print creation

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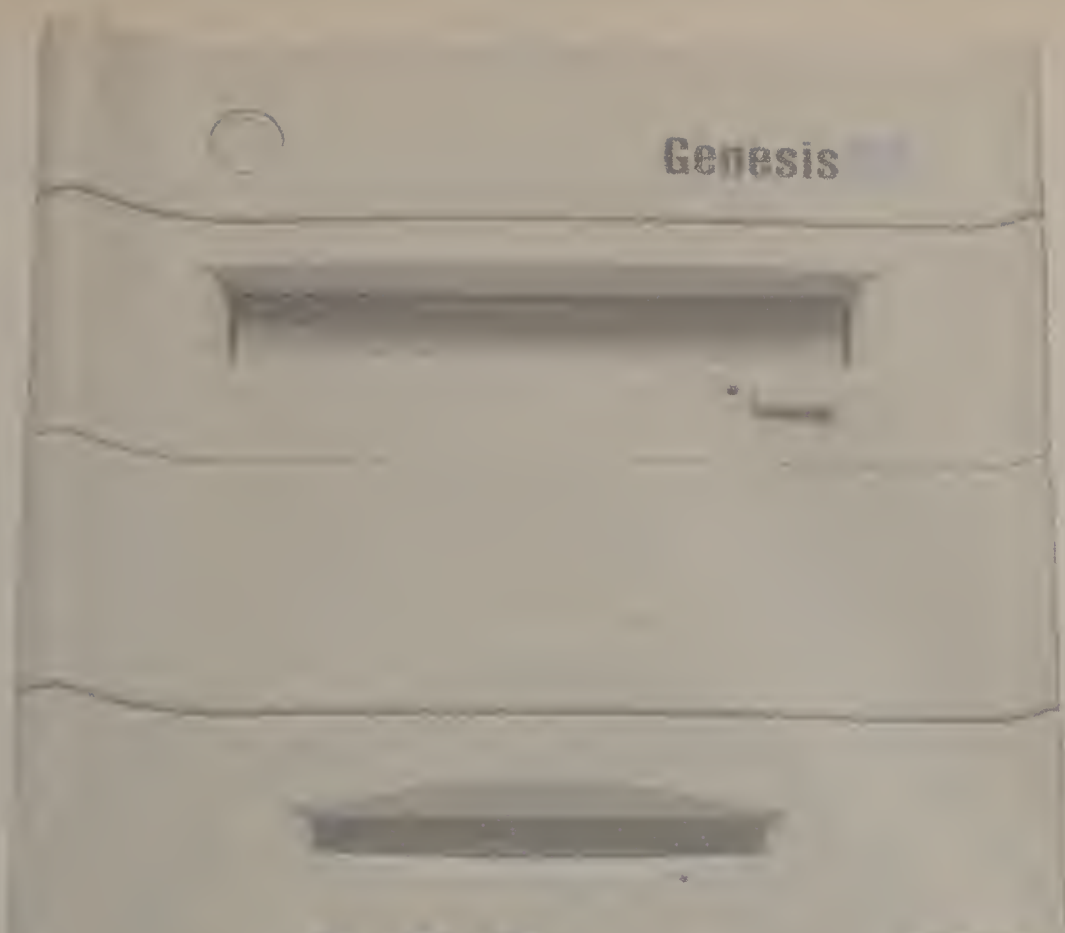
JOHN BLECK



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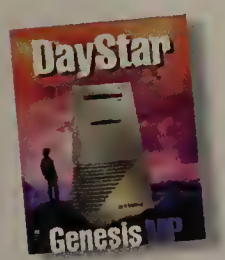
nPOWER 360+ For PowerMac 7500, 7600 8500, 9500 and SuperMac S900 & J700	Dual 180 MHz	$1,499

*Includes 16 MB RAM, 2 gigabyte hard drive, 4 MB graphics card



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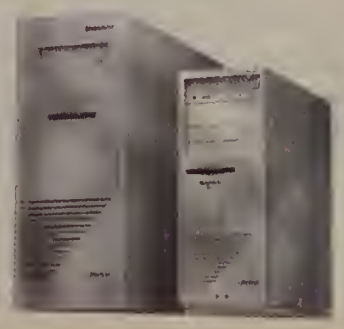
Circle 7 on reader service card



DAYSTAR DIGITAL

and CD-ROM authoring, but is now determined not to repeat those mistakes in Internet publishing.

He previewed Internet Explorer 3.0 for the Macintosh, showing a QuickTime VR video, a Macromedia Shockwave animation, and a ticking clock all on the same Web page. The clock was based on ActiveX technology, which many see as Microsoft's answer to Java. More ominous for Apple was a quick but impressive demonstration of Internet Explorer 4.0, which will feature a common interface for navigating the desktop and the Internet—if you happen to be a Windows user.

Andreessen's presentation could easily have been made to a roomful of business executives or investment bankers, as he touted Netscape's offerings for the corporate market. But in responding to a question from the audience, he hinted that Netscape will eventually offer a Macintosh version of its Web server (his exact answer was "not yet").

Two Shows in One

Based on the keynote and conference sessions, you would have thought you were at an Internet trade show. But the expo floor sent a much different message, as printing products dominated.

Many Seybold attendees are service-bureau managers, and while they may be eyeing the Internet for new business opportunities, they are still making money the old-fashioned way—by placing words and pictures on paper. Of course, the technologies for doing so are changing rapidly.

The old workflow of disk-to-film-to-plates-to-press is beginning to give way to more streamlined alternatives: computer-to-plate (CTP) for offset printing, plus a variety of purely digital printing technologies. CTP systems target commercial printers who want to produce plates for their own presses. As a result, service bureaus are looking more toward digital printing technologies as they anticipate the eventual decline of film production.

Prominent on the floor were digital presses, color copiers, and wide-format printers. Even more prominent were raster image processors (RIPs) designed to produce output on these devices. Indigo (617/937-8800, *http://www.indigonet.com*), Xeikon (312/558-1479), and Agfa (201/440-2500, *http://www.agfa.com*) introduced upgrades to their respective digital presses. Canon (516/488-6700, *http://www.usa.canon.com*) unveiled its long-awaited CLC 1000, a 30-pages-per-minute color printing system whose speed places it on the border between digital copiers and presses. EFI (415/286-8600, *http://www.efi.com*) demonstrated new versions of its Fiery controller for digital presses and wide-format ink-jet printers.

These are not the kinds of printers that will sit next to your Mac. Instead, they are likely to find a home in your local service bureau or corporate in-house graphics department. They herald a new era of on-demand, short-run color printing that can target specific groups or even be personalized for individual recipients. Despite the emergence of the Internet, a paperless world remains as far away as ever.

ARNOLD TIOSEJO

Apple Scanner Sports New Software

It doesn't look much different from Apple's (408/996-1010, *http://www.info.apple.com*) previous flatbeds, but the Color OneScanner 1200/30 sports new software and enhanced image-capture capabilities. The $800 scanner, based on a Canon engine, features 30-bit color depth and 600-by-1200-dpi optical resolution, interpolated to 4800 dpi. Bundled software includes Kai's Power Tools 3.0 SE; KPT Convolver 1.0 SE; Xerox TextBridge 3.0 for text recognition; and Dispatcher 2.0, which integrates scanning, image editing, OCR, fax, copying, and archival functions. Apple touts it as the first "Internet scanner," thanks to OCR-to-HTML conversion functions in the TextBridge software.—STEPHEN BEALE

"NEW APPLE SYSTEMS"

continued from page 35

and a PCI bus architecture. You can also expect performance enhancements for the 5400 and 5260, which feature a self-contained monitor and CPU. Both systems are available only for the education market. The Performa 5260 will move up to a 120MHz 603e CPU and a 1.2GB hard drive. The 5400 will get a 160MHz or 180MHz CPU and a 1.6GB hard drive.

Fireworks in 1997

The real fireworks will take place in the first quarter next year, when Apple announces new tower, desktop, and self-contained machines for the consumer market.

The desktop Performa will be Apple's bridge to the much-anticipated CHRP architecture. The Apple documents identify this system as the Tanzania, which refers to a motherboard architecture codeveloped with Motorola and used in that company's StarMax systems announced in September (see "Motorola's Hot New Macs," *Macworld*, November 1996). Sporting a 180MHz CPU, the Tanzania will include three PCI slots and SCSI, ADB, and serial ports.

The tower and self-contained models, both codenamed Gazelle, will feature 200MHz CPUs, faster bus speeds, 3-D graphics acceleration, 3GB hard drives, and 12× CD-ROM and DVD (digital versatile disk) drives. This is the first indication of DVD drives entering the Macintosh market.

With these new Macintosh systems, Apple Computer is moving to faster hardware adopted first by its OS licensees. These technologies are at the point of mass production, so everyone can enjoy their benefits.

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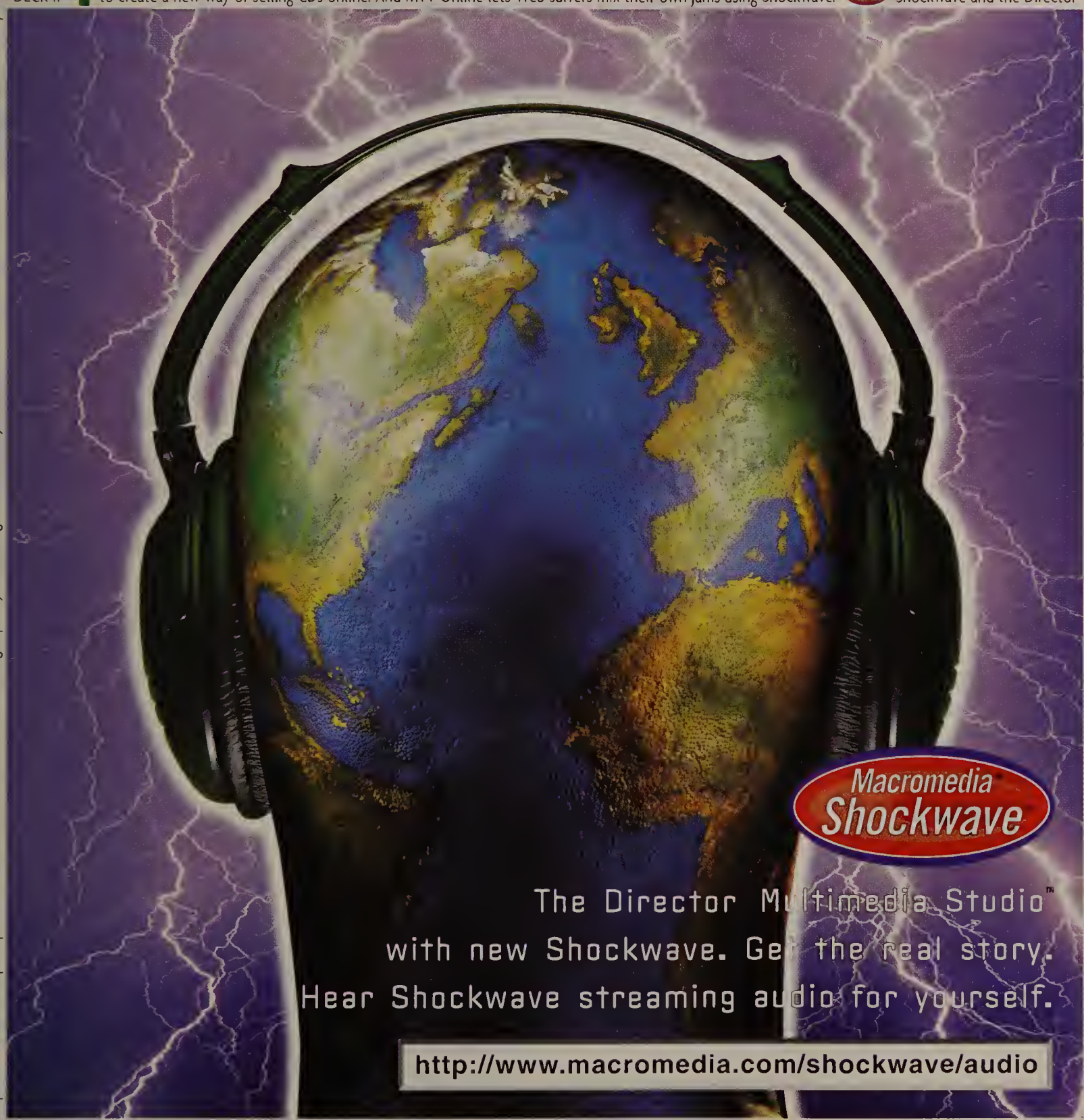

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Circle 26 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

BUSINESS

Help for Microsoft Office

Users of Microsoft Office can get a shortcut to productivity thanks to a pair of template collections from SoftKey (510/792-2101, *http://www.softkey.com*). OfficeMate ($32) features more than 400 templates on CD-ROM for Word and Excel, including business forms, scheduling aids, employment applications, company letterheads, fax cover sheets, certificates, personal and business financial spreadsheets, and sales and marketing spreadsheets. A built-in spreadsheet tool bar provides a standard interface for the templates. The Power Business Plans CD-ROM ($50) steps you through the process of creating a business plan. It features linked spreadsheets, charts, and documents, and includes a variety of PowerPoint presentation templates containing sounds, graphics, and special effects.

COMMUNICATIONS

Remote Modem Management

As Internet traffic gets heavier, some users are looking for the digital equivalent of a crossing guard. The MultiModem Manager, from Multi-Tech Systems (612/785-3500, *http://www.multitech.com*), lets you connect directly to the Internet to control and report on an unlimited number of modems from remote locations. Other features include remote configuration, Caller ID, and flash memory. The MultiFRAD frame-relay device allows access to both common-carrier and private frame-relay networks. You can connect legacy leased-line devices, such as statistical multiplexers or cluster controllers, to frame-relay networks. The MultiModem PCS and MultiModem ZDXv are bundled with Trio Information Systems' Communications Suite 5.0, which lets you send faxes, E-mail, or voice messages and receive them through a single in-box.

Eight Modems, One Board

Running out of expansion room on your Mac-based Internet server? CommBlaster, from Second Wave (512/329-9283), is a PCI card that houses up to eight 14.4-Kbps or 28.8-Kbps modems. Each modem is connected to the PCI bus through an interface chip. Configurations are available with two, four, six, or eight modems, priced from $395 to $2495.

DISPLAY

A Sharper Smile

Smile International (714/546-0336, *http://www.smilekfc.com*) has introduced two monitors that incorporate NEC's Cromaclear screen technology, which uses elliptical phosphors to yield a sharper image. The monitors support resolutions of up to 832 by 624 pixels at 75Hz using a $15 Mac adapter. The 15-inch CB6536SL costs $488, while the 17-inch CB6736SL is priced at $778.

Smile CB6536SL

GRAPHICS

Picture Albums on Your Mac

So where do you put all those images you've captured with your digital camera or scanner? Try PictureAlbum, from Media Minds (619/453-3133, *http://mediaminds.com*), a $100 software package that lets you create photo albums, product catalogs, insurance inventories, yearbooks, personnel directories, and other image collections. The software includes free-form layout tools, frames, and backgrounds, and lets you add text and audio annotations. Supported file formats include JPEG, TIFF, PICT, and Photo CD. You can also capture images directly through Adobe Photoshop.

PictureAlbum

FreeHand Files into Web Pages

Insta.html, from Trailer Parc Technologies (415/248-1350, *http://www.trailerparc.com*), automatically converts Macromedia FreeHand layouts into Web pages. The $179 package first converts documents into tables that retain the original design. Text, images, and drawings are then automatically converted into HTML, GIF, JPEG, and Macromedia Shockwave files. The FreeHand Xtra plug-in supports both the Netscape-Microsoft and HTML 3.2 multiple fonts and styles standards.

A Bundle of Graphics

Looking for a deal in graphics software? Macromedia (415/252-2000, *http://www.macromedia.com*) has a package for you. The $449 FreeHand Graphics Studio 7 bundle includes the latest versions of FreeHand, xRes, Extreme 3D, and Fontographer. xRes 3, the new release of Macromedia's image-editing program, exports Web file formats, creates image maps, reads Adobe Photoshop 3.0 files, and rasterizes vector graphics. It also supports Macromedia's Shockwave Web format. Extreme 3D 2 includes Internet file support, new modeling tools, and support for QuickDraw 3D.

MULTIMEDIA

Authorware Reduced

The Authorware Interactive Studio, from Macromedia (415/252-2000, *http://www.macromedia.com*), is powerful software, but its $5000 price tag has scared away many users. Now, aggressively pursuing the intranet market, Macromedia has dropped the price of the multimedia software bundle to $1999. The package includes Authorware 3.5, Director 5, Macromedia xRes SE, and SoundEdit 16/Deck II. Educational pricing is also available.

Vincent and Theo Do Video

Data Translation's Media 100 division (508/460-1600, *http://www.media100.com*) has released an updated version of Vincent, the PCI board at the heart of its Media 100 and Media 100qx digital-video systems. Working with current Media 100 software, the Vincent 601 board provides YUV 4:2:2 digital component video processing, as well as support for CCIR 601 rectangular and computer graphic square pixels. Vincent delivers real-time resampling between 720-by-486 and 640-by-480 NTSC video, along with 720-by-576 and 768-by-576 PAL images. Theo, an upcoming coprocessor daughterboard, provides SMPTE-259 serial digital I/O, a second JPEG codec for dual-stream processing, support for the Movie 2 bus connector, and support for AES/EBU and S/PDIF digital audio. Street prices for Media 100 systems start at $4000.

New Tools for After Effects

Studio Effects, from MetaTools (805/566-6200, *http://www.metatools.com*), is a $695 collection of 19 plug-ins for Adobe After Effects 3.0 and 3.1. The package includes 3-D particle systems, distortion filters, lighting effects, liquid displacement effects, and numerous transitions. The software also supports multiprocessing operations on multiprocessor Macintosh systems.

continues

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New Products

PRINTING

Faster Phaser

The cost of color output keeps falling. Tektronix (503/682-7377, *http://www.tek.com*) continues the trend with the Phaser 300X, a $7995 upgrade to the company's tabloid solid-ink device. The 300X is 50 percent faster than the earlier Phaser 300i, Tektronix says. The system includes PhaserMatch calibration software and a plug-in that lets you print directly from Adobe Photoshop.

PUBLISHING

Digital Cameras

Digital cameras these days come in every shape and size—not to mention price range—as seen in the latest announcements from Olympus, Kodak, Nikon, and Phase One.

• Olympus America (516/844-5000, *http://www.olympusamerica.com*) has introduced the D-200L and D-300L cameras, which feature a built-in LCD preview window. The $599 D-200L captures images at 640-by-480-pixel resolution or 320 by 240; it can store 80 images at the lower resolution or 20 photos at high resolution. The $899 D-300L boosts resolution to 1024 by 768 or 512 by 384. It stores 30 images at high resolution or 120 images at low resolution.

• The new DCS 410, from Eastman Kodak (716/724-7007, *http://www.kodak.com*), incorporates a Nikon N90S 35mm camera. The $7000 product captures 36-bit color images at 1536-by-1024-pixel resolution. Images are stored on removable PCMCIA cards.

• The E2N from Nikon (516/547-4200), expected to sell for just under $10,000, is a self-contained SLR camera that offers the equivalent of 800 or 3200 ISO, enabling photographers to capture images in low-light situations. It captures images at 1280 by 1000 pixels. A continuous video mode lets you view images on a monitor after pressing the shutter. A PC Card can store 84 images.

• At the high end of the price scale we find the $30,000 PowerPhase, from Phase One (516/757-0400, *http://www.phaseone.com*), which produces images with 7000 horizontal and vertical pixels, creating a 140MB file. Designed for use with medium-format cameras from Hasselblad and other vendors, it is aimed at service bureaus with in-house digital photography studios. Due to an exposure time of about 7 minutes at the highest resolution, the camera is suitable for product photography but cannot capture moving objects. The camera connects directly to the Mac.

Suite Scanning on the Mac

Need a tool to organize your scanner applications? ViewOffice PowerSuite for Macintosh, from NewSoft (510/252-0267, *http://www.tophat.com*), is a $79 package that includes modules for scanning forms, business cards, text documents, and images. It's all organized around Presto PageManager, a "scanning OS" that controls all scanner operations. A customizable

ViewOffice PowerSuite

application bar provides one-button access to your favorite scanning programs. The suite also includes Wordlinx for text recognition, Microspot PhotoFix for image editing, and Kai's PowerGoo for transforming scanned images. The software works with any scanner that supports TWAIN or Adobe plug-ins.

continues

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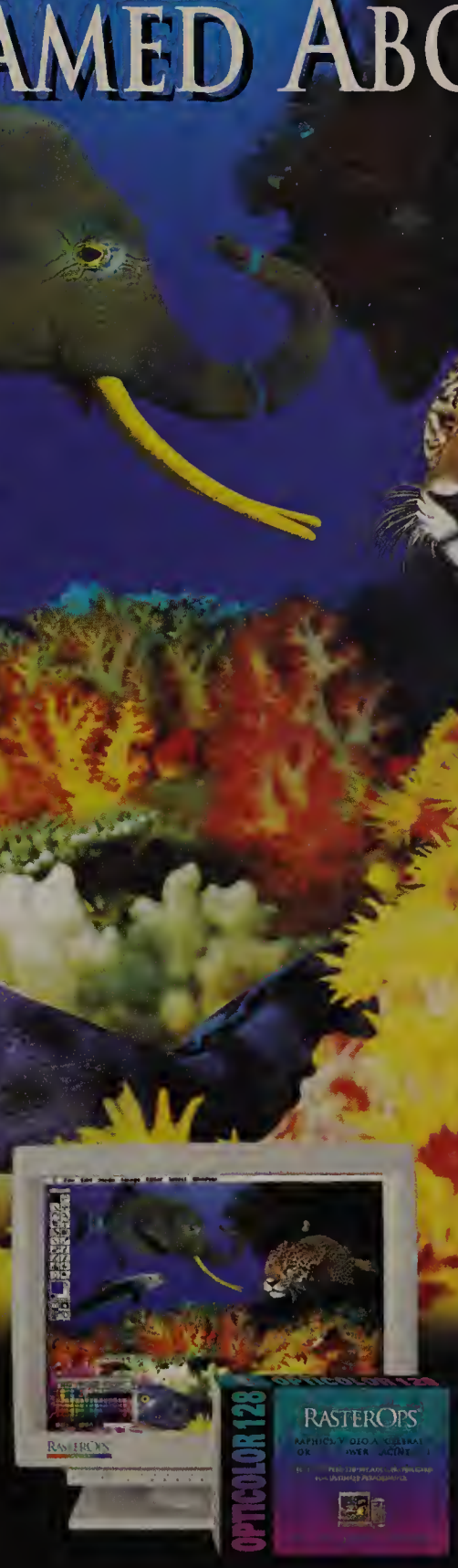

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New Products

XPress-to-HTML Converter

If you want to move your QuarkXPress layouts to the World Wide Web, Compatible Systems Engineering (703/941-0917, *http://www.compatsys.com*) says it can do the job more quickly than others. Archiver HTML is a $395 QuarkXPress XTension ($295 until November 15) that extracts text from XPress layouts and converts it into plain text and HTML text. The product is based on the company's experience moving text from large QuarkXPress documents, such as daily newspapers, into databases.

STORAGE

High-Capacity Tape

As networks get bigger, so does the amount of data you need to back up. The new SDT-9000 tape drive from Sony (619/279-2724, *http://www.sony.com*) stores up to 12GB (or 24GB with hardware compression) on a 3.5-inch DDS-3 media

Sony SDT-9000

cartridge. Throughput is 1.2 MBps for uncompressed data. The $2495 drive is backward-compatible with DDS-2 and DDS cartridges. Sony is also offering a DDS-3 cartridge, the DGD125M, for $50.

Going APS over Storage

Targeting users who want backward compatibility with their SyQuest 270MB cartridges, APS Technologies (816/483-6100, *http://www.apstech.com*) is releasing its new 3.5-inch APS M540 removable-media drive, which uses 540MB data cartridges (515MB once they're formatted for Macs). Based on a Nomai mechanism, the drive is designed to offer sustained 3-MBps data-transfer rates and 27ms average access time, according to the company. The 4500-rpm drive includes a 512K cache buffer and can read, write, and format SyQuest 270MB cartridges. The street price is $300, which includes a two-year warranty.

UTILITIES

Now for an Update

Keeping up with often-conflicting system extensions and control panels can be a full-time job. Now Utilities 6.5, from Now Software (503/274-2810, *http://www.nowutilities.com*), helps take the task off your hands. The rewritten Now Startup Manager, in addition to isolating system conflicts, features a Startup Manager Reference Library with information on more than 1100 extensions, control panels, and conflicts. Updated versions of the library can be downloaded from the Now Utilities Web site. Startup Manager also manages third-party plug-ins for Netscape Navigator, Adobe Photoshop, and other programs. The $90 package also includes 30 plug-ins for Now Tabs and Now Shortcuts, and enhancements to Now Super Boomerang, Now QuickFiler, Now FolderMenus, Now AutoType, Now Tabs, Now Shortcuts, and Now Scrapbook. Now Startup Manager is available by itself for $55.

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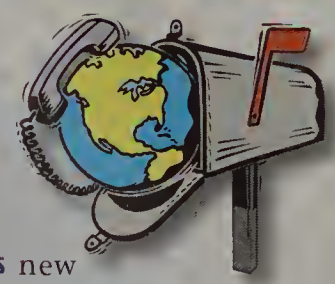

VocalTec's new **Internet Voice Mail,** *Version 3.0* is a software program that lets you send **voice mail** over the **internet** for **FREE** to virtually **anyone** with an e-mail address. **Internet Voice Mail,** works **like** your **e-mail program** — simply enter a person's e-mail address, record a message, and send it off. You can even **add text** or **attach files**. In a few minutes, your friend **anywhere** in the **world** can **hear your voice** for **just the cost of your Internet connection.**

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What you never thought possible.™

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Reviews

CorelDraw 6 Suite

COREL DEBUTS ON THE MAC WITH A RESOUNDING THUD

HANK OSUNA

THE CORELDRAW 6 SUITE IS A COLlection of more than 200MB of graphics applications, plus one word processor that stems from Corel's acquisition of WordPerfect. With a price equal to that of Adobe Illustrator and Macromedia FreeHand, CorelDraw Suite obviously stresses value. But if you bring any experience to the table, you won't bask in the glow of a good purchase for very long.

Even CorelDraw's most basic functions bear little resemblance to the Macintosh graphics conventions that have grown up over the years. Add to this the fact that only about half the programs in the Suite are unique to CorelDraw—WordPerfect; Ray Dream Designer (dubbed Dream 3D); Netscape Navigator; and the numerous Adobe Photoshop–compatible plug-ins from MetaTools, Xaos Tools, Cytopia, and Extensis already may have found their way onto your hard drive. Worse, two seemingly unique applications—Artisan and Chart—are actually warmed-over vestiges from the Mac's past. The upshot is an odd assortment of generally unrelated programs that is certain to disappoint professionals and overwhelm new users.

Biggest, but Not Best

CorelDraw is the flagship application from which the suite draws its name, and it sets the tone for the other applications. It runs on nothing short of a Power Macintosh. Its minimum installation takes up more disk space than Illustrator, FreeHand, and all their tutorials combined. And it requires at least 16MB of application RAM, more than enough to run Illustrator and FreeHand simultaneously.

Although these read like the hardware requirements for a powerhouse application, only a few of CorelDraw's capabilities are outstanding. One area in which Draw is stronger than Illustrator or FreeHand is special effects. The Envelope palette lets you distort objects with significantly more freedom than in other draw programs. The Blend palette lets you create gradient blends along a path. And the Extrude palette projects an object into three-dimensional space. The upcoming FreeHand 7 will offer similar enveloping and superior blending capabilities, but until that program ships, Draw has the edge. Draw also makes quick work of transformations, permitting you to scale, flip, rotate, and skew with the arrow tool.

However, the day-to-day functions are at times surprisingly inept. You can't select the grabber hand from the keyboard, but that's OK, because it's ultimately easier to use the scroll bars any-

RATINGS	Outstanding ★★★★★ = 9.0–10.0	Very Good ★★★★ = 7.0–8.9	Good ★★★ = 5.0–6.9	Flawed ★★ = 3.0–4.9	Unacceptable ★ = 0–2.9

way. Rather than dynamically moving the page in the window—as is the case in every other graphics program—Draw's hand tool merely creates a line showing the distance and direction of your drag; the screen updates after you release. I encountered a consistent screen redraw problem when I was clicking in the standard zoom box on the far right side of the title bar (see "Suite of Errors"). And all zoom ratios are measured relative to the window size. Enlarging the window to take in more of a graphic has the unfortunate side effect of zooming in, thus preventing you from seeing anything you couldn't see before.

Longtime Mac artists will find much to scratch their heads over in Draw 6. The program lacks a Font menu, and there are no keyboard shortcuts for enlarging or reducing type size. When you're selecting lots of objects, Draw gathers the selection with eight enormous handles—easy to spot from a distance, but virtually useless for determining exactly what is and is not selected. For example, if you have an object selected in the upper right-hand corner of an illustration and another object selected in the bottom left, the eight handles appear around the entire illustration, as if the whole thing were selected. You have to use different tools to move and reshape objects (though, in Corel's defense, you can switch from tool to tool using the keyboard). The Bézier path tool leaves much to be desired. And you have to edit points using a bizarre Nodes palette that manages to accomplish less with its 15 unrecognizable buttons than Illustrator does with four reshaping tools and the Join command. Simple path operations such as uniting or intersecting objects require several steps. Even wrapping text around multiple objects is an ordeal. If you're familiar with CorelDraw for Windows, then you've grown accustomed to much of this. But artists who grew up on the Mac will hate it.

A few items will baffle new users as well. Nine pages into the manual, you are twice instructed to bring up the Apple Guide help (which is the primary form of documentation) by pressing the ⌘ key—nothing more. Needless to say, this doesn't work. Draw also has problems editing a piece of clip art stored on the CD-ROM. If you work in a different application for a while without saving the clip art to your hard drive, the program delivers an error message saying it can't open the file that is already open. If you close the file and request that Draw save your changes, it gives you the same error message and closes the file without saving. No program can save to a CD, but Draw should deliver an accurate error message—something to do with saving, for example—and should permit you to save your changes elsewhere. Also be careful when importing images from the CD. A special option lets you crop images as you import them, but the cropping you specify and the cropping applied rarely match. And while no drawing program is particularly speedy at printing JPEG or TIFF images, Draw takes about three times as long as either Illustrator or Freehand.

Relive the Thrill of FatBits

The paint module, Corel Artisan, may well be the worst paint program currently available for the Mac. If it looks familiar, it's because it was originally released by Time Arts as Oasis back in 1991. Oasis wasn't good enough to keep up with the competition then, and its slumbering code—barely disturbed by Corel—has been improved only negligibly. The special effects are awful, the brushstrokes are jagged, the pressure sensitivity is crude, and it lacks transformation capabilities. And search as you might, you won't find a zoom or hand tool. The only zoom function is a 150-by-150-pixel window that magnifies everything under your cursor, including dialog boxes, background icons, and those little dots in the scroll bar.

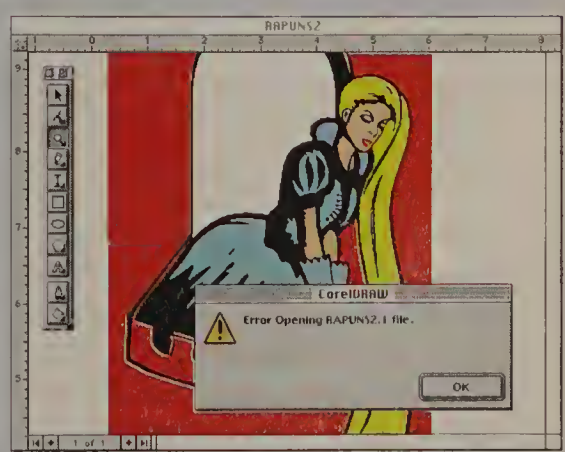
Corel's only meaningful improvement to Artisan is the program's support for Photoshop-compatible plug-ins. In fact, the Suite ships with four sets of plug-ins: the entire PhotoLab collection, an RGB-only version of Intellihance, a stripped-down version of Kai's Power Tools, and old versions of Paint Alchemy and Terrazzo (all covered in "Top 20 Photoshop Plug-ins," *Macworld*, September 1996). The plug-ins are fine, but their inclusion is purely a marketing ploy. Why use perfectly good filters with a program this awful?

The Suite Continues

Other members of the Suite are more successful than Draw or Artisan. CorelDream 3D is a three-dimensional drawing and rendering program that's equiva-

Suite of Errors

Here are a few illustrations of my favorite CorelDraw peculiarities. The top screen demonstrates the dangers of clicking in the zoom box (circled in red), which can redraw the screen in some odd ways. In this case, for example, the vertical scroll bar has decided to divorce itself from the right edge of the window, and the horizontal scroll bar has gone into hiding. In the second screen, I cropped the cows as shown on the left before importing them, but CorelDraw decided that my image might look better as cropped on the right. (As they say, that's not a bug, that's artificial intelligence.) And at the bottom, an errant alert box has become so muddled that it doesn't realize the RAPUNS2.1 document is already open and in plain sight. I ran into every one of these bugs several times, often enough to set up some really nice screen shots.



lent to Ray Dream Designer 4.0 (see *Reviews*, May 1996). Although not quite the equal of Specular Infini-D, Dream 3D is a sturdy application that walks you through the process of creating 3-D images with Modeling and Scene wizards. Unfortunately, Corel has expended no effort toward making the program consistent with Draw or Artisan. It doesn't even include Apple Guide help (offered by every other program in the Suite). If you're interested in Ray Dream Designer, you might as well go to the source. Fractal Design sells a more recent version, which supports QuickDraw 3D, for $199.

CorelChart is one of those ancient programs engineered so well that it still holds up after all these years. Long a part of Adobe Persuasion, Chart is a standalone application in CorelDraw Suite. But while it's much more capable than Illustrator's graphing tool, there's no way to bring a chart into Draw. (Draw lets you select a chart inside the Import dialog box, but ignores you when you click on the Import button.) The benefit of the charting tool in Illustrator is that you can edit your graph like any other object and turn it into a work of art. In CorelDraw, you create a graph in Chart, you print it, and that's that.

WordPerfect 3.5, quite happily, is our favorite business word processor (see "The Macworld Office," June 1996). You can drag objects from Draw and drop them into a WordPerfect document, so you could use WordPerfect as a poor man's publishing program. But really, truly, it's a text editor, and its inclusion in the CorelDraw Suite just adds another lump to the grab bag. If you want WordPerfect, purchase it separately from Corel for $129.

The Last Word

The CorelDraw Suite also includes a procedural texture generator (Texture), a utility that traces bitmapped images and turns them into objects (Trace), a cataloging program (Multimedia Manager), and a font manager (MasterJuggler). In contrast to Draw and Artisan, these utilities perform quite well, and at least one, Multimedia Manager, is a very practical program that I intend to leave on my hard drive.

But while I appreciate these fine utilities, they cannot make up for the poor performance of the core applications. A graphics suite should include solid drawing and image-editing programs, and the CorelDraw Suite provides neither. There also ought to be tight integration between the various graphics programs, and the CorelDraw Suite provides next to none.

If you can afford to pick and choose—installing, say, Texture and Multimedia Manager and tossing the other applications—then you can find a few diamonds in the rough. Otherwise, opt for building your own graphics suite using top-of-the-line applications like Photoshop, FreeHand, and Infini-D. It might cost you a little more, but you'll be better off in the long run.—DEKE MCCLELLAND

RATING: ★★/4.6 **PROS:** Draw has good special-effects capabilities; support utilities are better than main drawing and painting applications. **CONS:** Bloated collection of arbitrary programs; Draw ripe with bugs and nonstandard features; very little integration between programs. **COMPANY:** Corel (613/728-8200, *http://www.corel.com*). **LIST PRICE:** $595.

Canvas 5.0

MIDRANGE PROGRAM WITH PROFESSIONAL PRICE

THOUGH WE'VE BEEN evaluating beta releases of Deneba's Canvas 5 for close to a year, Deneba shipped us the final version just a few days before this issue was ready to go to press. The long-awaited update—coming three years after the release of the last major revision, Canvas 3.5—is both a refreshing improvement and a disappointment. While arguably the best program for weekend designers, Canvas 5 still isn't ready to compete with Adobe Illustrator or Macromedia FreeHand.

A recent marketing flyer boasts that Canvas 5 incorporates the best features of Illustrator, FreeHand, Adobe Photoshop, and QuarkXPress. And though it does a fair job of imitating the first three—comparison to QuarkXPress is absurd—it lacks the control and reliability that make these packages the overwhelming favorites of professionals. For example, the Bézier drawing tool in Canvas 5 is no better than its counterpart in version 3.5. You still can't draw a simple cusp—like the tip of a crescent moon—with any degree of accuracy. You have to enter a restrictive editing mode to reshape paths, and screen redraw problems are rampant.

Where Canvas succeeds is in its integration of drawing and image-editing features. Rather than distributing its capabilities among a dozen unrelated, memory-guzzling applications—as in the case of competitor CorelDraw 6 Suite—Canvas provides all features under a single, streamlined roof. You can access both the drawing and image-editing tools simultaneously, and apply them in equal measure to a single document. The image-editing functions are quite good, although they're not so much modeled after Photoshop as lifted directly from it. All the filters are there (with image-window previews), as are the color-correction commands. Switching in and out of image-editing mode is awkward, and I encountered a few bewildering screen redraw problems, but Canvas 5 should prove sufficient for small image work.

The Last Word

Though Canvas 5 offers many new features—including impressive blending and distortion palettes—and the interface is clean and serviceable, these evolutionary changes don't justify the $200 upgrade to the program's price tag. For a more detailed analysis of Canvas 5 and its improved vector capabilities, keep an eye out for the January 1997 issue of *Macworld*.—DEKE McCLELLAND

RATING: ★★★/5.7 **PROS:** Good integration of draw and paint; simplified interface. **CONS:** Cumbersome drawing and editing tools; $200 more than Canvas 3.5. **COMPANY:** Deneba (305/596-5644, *http://www.deneba.com*). **LIST PRICE:** $599.95.

QuarkImmedia

AN EASY MOVE FROM PRINT TO MULTIMEDIA

PRINT DESIGNERS WHO ARE CONsidering going back to school to learn how to design for multimedia are bound to appreciate QuarkImmedia, a new authoring tool from the company that gave us the popular high-end DTP package QuarkXPress. QuarkImmedia is an XTension (Quark's term for its plug-ins) that lets you transform QuarkXPress pages into multimedia projects benefiting from the sophisticated typography and layout control QuarkXPress users swear by. This approach lets designers use page-layout-style tools to create multimedia and Internet projects, and QuarkXPress users will take to it like ducks to water.

QuarkImmedia has two parts: a design tool and a viewer. On CD-ROMs and kiosks, the viewer simply lets the user interact with the QuarkImmedia project; on the Internet, the free viewer—available for download from Quark's Web site (*http://www.quark.com*)—is a bit more than that. Unlike Macromedia Shockwave, QuarkImmedia's viewer isn't a browser plug-in. Instead, it works as a helper application—you can configure your browser to switch automatically to the viewer when it encounters a QuarkImmedia page.

A Familiar Face

QuarkImmedia's design tool is an authoring environment based on the familiar QuarkXPress interface. QuarkImmedia adds new menu items and a palette that lets you turn your pages into multimedia or Web projects, complete with interactive elements, sound, video, and animation. Herein lies the advantage of QuarkImmedia: by sticking with the QuarkXPress page-layout interface, Quark makes it easy for print designers to leap into multimedia without having to learn a whole new set of skills required by programming-oriented authoring packages such as Macromedia's Director or Authorware programs.

As a QuarkXPress user with experience assembling print pages, I liked using QuarkImmedia's design tool to assemble multimedia projects in a familiar way, combining advanced page-layout tools—such as precise typographic controls, master pages, style sheets, libraries, and keyboard shortcuts—with the ability to add QuickTime movies, sound, hot text, and interactive buttons.

A Family Resemblance QuarkImmedia adds its palette to the basic QuarkXPress interface of text and picture boxes.

For this review, I built an interactive QuarkImmedia project and found the process remarkably like laying out a page. Instead of opening a new page, I simply opened a new project and built its basic parts using QuarkXPress text and picture boxes. Then I used the new QuarkImmedia features to make certain areas of the page hot, to add multistate (on/off) buttons, and to add other interactive features. From start to finish, it took just a few hours. The process was nearly as easy as laying out a brochure.

Web Pages, Hot off the Press

Although you can use the QuarkImmedia design tool to create multimedia projects for CD-ROMs or kiosks, it's far more interesting as a Web design tool. QuarkImmedia designers can create intricate Web pages that are considerably more stunning than typical cyberfare.

Proving that it's more than just another me-too player in the cybermedia world, QuarkImmedia includes tools for tackling bandwidth issues. For example, you can specify when the QuarkImmedia viewer should download a particular multimedia element. Likewise, you can select from a range of compression algorithms for sound, including one that converts stereo to mono, cutting the size of the file virtually in half.

Unlike other Web-page extensions to QuarkXPress, such as Astrobyte's BeyondPress or HexMac's HexWeb XT (see *Reviews*, October 1996), QuarkImmedia doesn't convert QuarkXPress pages to HTML code. Instead, it avoids the design constraints of HTML, particularly the annoying ones that constrict the typography on a typical Web page.

Although it's true that this approach means a user needs to download the free viewer in order to see a QuarkImmedia page over the Internet, the advantages for designers outweigh the minor inconvenience of having to put yet another browser-type application on your hard drive. One example: you can configure projects created in QuarkImmedia to take control of the user's entire screen, not just the window you see in typical browser applications. For another, designers who develop projects in QuarkImmedia can precisely control the typography on their Web pages; type is antialiased and rasterized upon export so it looks the same on any platform, regardless of the fonts available on the receiving computer. (QuarkImmedia doesn't, however, rasterize type in editable text fields, like those in forms designed to receive user-entered information.)

One fairly significant drawback to QuarkImmedia's proprietary format is that its pages do not work with the America Online or CompuServe Web browsers, since these providers use dynamic IP addresses instead of the unique ones that QuarkImmedia requires.

The Last Word

Experienced print designers will be very comfortable with QuarkImmedia, a product that proves it's possible to make the jump from print to multimedia without learning a whole new set of skills. Salty old Webmasters—those who cut their teeth on HTML code—will take more convincing and, because they will have to begin by learning how to use QuarkXPress, will have a steeper learning curve to climb.—BARBARA ASSADI

RATING: ★★★★/8.0 **PROS:** On-screen typography is second to none. **CONS:** Web pages don't work with AOL or CompuServe browsers. **COMPANY:** Quark (303/894-8888, *http://www.quark.com*). **LIST PRICE:** $995 (requires QuarkXPress 3.32 or higher).

Dueling HTML Editors

CLARIS HOME PAGE PREVAILS OVER GOLIVE PRO, BUT BOTH NEED WORK TO LIVE UP TO PROMISE

TWO NEW ADDITIONS TO THE ONgoing deluge of HTML editors are Claris Home Page 1.0 and golive Pro 1.1. Each brings some much-needed new features to the table, but Claris's polished entry is a better choice for novices and experienced users alike.

Common Tasks

Both programs give you the familiar tool bar and editing window, but they take different approaches to showing you your work. Claris Home Page has three modes: Edit Page, a near-WYSIWYG view where you add and format text, links, and images; Preview Page, which attempts to show you how your pages will look; and Edit Source, which switches to text view and lets you edit the HTML directly (though I'd like to see the HTML tags colored for easier viewing).

In addition to its WYSIWYG mode, golive sports a unique outline-style HTML editor. Unfortunately, it's harder to edit HTML in an outline than on a full page, golive doesn't let you switch between outline and WYSIWYG views, and opening an existing HTML document in the outline editor doesn't always work smoothly.

Both programs let you format text using the tool bar or menu commands, and you can choose text colors from a menu or from the Color Picker. To add specialized attributes in Home Page, you use the Object Editor. This floating palette lets you include additional HTML—to add a background color to table cells, for example. golive uses dialog boxes to add attributes, but you can't add HTML. In either product, it's a snap to create hyperlinks.

If you drag a PICT file onto a page from the Finder, both programs convert it to a GIF; you can also add JPEG files. But there are several media types that Home Page doesn't directly support, forcing you to insert QuickTime movies or Macromedia Shockwave animations in Edit Source mode. And don't expect much help creating the HTML for adding Java or JavaScript—you're limited to writing JavaScripts in the Edit Source mode and reserving space for a Java applet. In contrast, golive readily handles Java, QuickTime, QuickDraw 3D, Shockwave, and generic Netscape plug-ins.

Home Page comes with 5MB of useful clip art that you simply drag onto the page you're creating. In golive, a Project window tracks page elements and makes sure they're in a single folder for easier uploading to a Web server.

Both programs create frames similarly, though Home Page is easier to use. Neither lets you preview a composite page with frames, however; instead, you must switch to a browser to check your work. Like most other HTML editors, both programs allow only one form per page, and both could use better documentation (though golive's needs quite a bit more work).

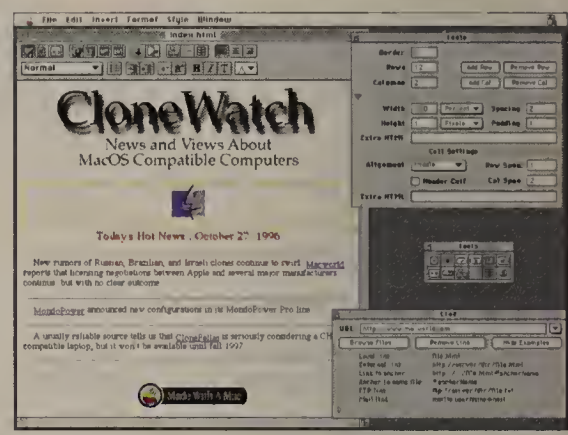
Unique Strengths

Tables are easy to create in Home Page: you simply draw them directly in the editing window. You drag a cell's selection handles to make it span rows or columns, and it's easy to resize the entire table. Amazingly, golive doesn't have a table editor at all, though it does let you drag table tags from a palette into the outline editor.

Home Page has a hardwired understanding of HTML; the only way to use new tags in your pages is in Edit Source mode. golive stores its tag definitions in an updatable database, and you can add your own tags if necessary.

Both programs have a decent image editor that lets you create image maps, though golive edges out Home Page with superior tools for defining regions. golive also creates both client-side and server-side maps, while Home Page is limited to server maps.

One cool Home Page feature is the Document Statistics dialog box, which tells you how long your page will take to download at 14.4 and 28.8 Kbps. Every HTML editor should do this. But Home Page's biggest failure is that the Preview Page mode can't display a page as it will appear in a browser. Tables are forced to the full width of the editing window, and all columns are displayed at the same width—even if you coded specific widths. And if you use a GIF as the background, you can't see it until you preview the page in a browser. There's also a cosmetic bug: an HTML comment in the body of the document will show up in the Edit Page or Preview Page mode as raw HTML.



Page Building Claris Home Page's Object Editor palette (top right) changes depending on the type of object you're working with.

The Last Word

While Claris Home Page and golive have unique strengths, they also share some weaknesses—for example, neither is particularly well suited to maintaining large sites, lacking the link-validation and maintenance abilities of Adobe's SiteMill. But Claris Home Page is both powerful and easy to use; once the rough edges have been smoothed out, it will be the one to beat. golive is an attractive program that shows promise, but it needs a bit more development before it will deserve serious consideration from Web-page creators.—TOM NEGRINO

Claris Home Page 1.0

RATING: ★★★/6.9 **PROS:** Good table editor; nice image libraries; easy to use. **CONS:** Significant WYSIWYG display problems; needs better support for multimedia. **COMPANY:** Claris (408/727-8227, *http://www.claris.com*). **COMPANY'S ESTIMATED PRICE:** $99.

golive Pro 1.1

RATING: ★★/4.9 **PROS:** Good support for multimedia; innovative HTML-tag database; superior image-map editor. **CONS:** No table editor; poor HTML importing; can't tweak HTML directly; sketchy manuals. **COMPANY:** gonet communication (415/463-1580, *http://www.golive.com*). **LIST PRICE:** $99.

Macro-Creation Utilities

QUICKEYS FOR SIMPLICITY, KEYQUENCER FOR POWER

PRESS A KEY, AND THE MAC TYPES your return address; press another, and ClarisWorks opens; press a third, and the Mac signs on to America Online, prints your E-mail, and signs off. These luxuries are available only to people who use macro software, such as the newly updated QuicKeys 3.5 and KeyQuencer 2.0. Neither upgrade merits the extravagant jump in version numbers, but both represent good news for anyone who could use a boost up the productivity curve.

QuicKeys Isn't Quicker

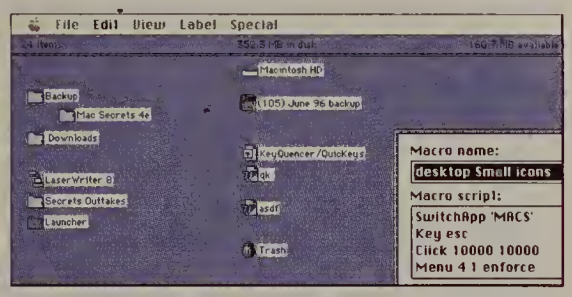
The new version of QuicKeys offers only three significant new features, and PowerPC-native code, alas, isn't among them. QuicKeys 3.5 offers a clean, revamped interface in a genuine Macintosh window—for the first time, you can move or resize the screen in which you create, arrange, and choose keystrokes for your macros. The tabbed dialog-box design makes the program easier to understand; for example, macros that work only in one program are listed in one tab, and universal macros appear in another.

Taking an obvious cue from its upstart rival, Westcode's tool-bar–based One-Click (see *Reviews*, May 1996), QuicKeys now lets you create floating tool bars packed with tiny icons representing your favorite macros. You can summon any tool bar with a keystroke of your choice. In effect, this feature lets you design a significant new interface add-on for any application.

Unfortunately, the tiny tool-bar tiles all look alike, and it's nearly impossible to remember which, for example, is your "Launch Photoshop" tile. True, identifying text tags pop out of each tool-bar tile as your cursor passes, and you can design your own tool-bar buttons in a paint program (if you're an artistic genius: the tiles are only 17 by 19 pixels). Still, a labeled-buttons option would be an improvement.

QuicKeys' most successful new feature is its batch-processing macro, which lets you apply the same macro to every single file in a designated folder—a blessing to Adobe Photoshop and E-mail fans. For veteran QuicKeys users, the years of awkward workarounds are over.

Despite these improvements, some things were lost in the overhaul. After editing the individual steps of some macros, you can no longer exit QuicKeys' nested dialog boxes by repeatedly slapping the enter key, as you could in version 3; now you must close the final window manually, either by clicking in the close box or by typing ⌘-W. (If you think this is a silly objection, remember that people buy this program because they're efficiency nuts.)



The Impossible Finder Playing with power sure is fun. Using the KeyQuencer control-panel script shown here, you can switch the desktop's view mode to Small Icon—which is otherwise impossible.

Though the new-feature list isn't mind-blowing, the best of QuicKeys remains unchanged. It can still make multistep processes foolproof for Macintosh newcomers and take the tedium out of repetitive tasks for power users.

QK, Meet KQ

At first glance, you might wonder why Binary Software bought the rights to this shareware program, gussied it up, and released it as a commercial rival to QuicKeys and Affinity Microsystems' Tempo. After all, KeyQuencer can't create macros automatically by "watching" you perform the steps, as QuicKeys can; instead, you have to type out programmer-style code with no mistakes. Furthermore, this program doesn't let you create a separate set of macros for each program you use, as QuicKeys does; you have one gigantic set of macros that attempt to work no matter what program you're using. Given these two rather substantial failings, why should KeyQuencer 2.0 exist?

For starters, this program costs less than half QuicKeys' price, requires only one-third the RAM (170K instead of 530K), and executes its macros faster—KeyQuencer runs in native mode on any PowerPC-equipped Mac.

Perhaps more important, KeyQuencer can perform amazing stunts that would confound its competition. For example, KeyQuencer can synchronize the clocks of all Macs on a network; make specified files or folders instantly invisible; and put a highlighted icon immediately into the trash. It can also help find a lost PowerBook cursor; manage ten separate clipboards; quit the Finder; control the playback of an audio CD without opening the AudioCD desk accessory; toggle your PPP control panel on or off; and create StuffIt files. Even such a simple act as copying a folder to a backup disk every night is beyond QuicKeys; KeyQuencer does it with a single command. And KeyQuencer can do all the easy stuff—like typing your return address and logging in to AOL—too.

The Last Word

KeyQuencer and QuicKeys are the yin and yang of macro software. KeyQuencer offers speed, small size, low price, power, and stability for the super-power user who isn't easily intimidated. QuicKeys 3.5, on the other hand, exists to make macros easier—now more than ever. Its new interface is simpler and more attractive, and its tool bars put macro power only a mouse-click away. KeyQuencer is the macro program for the speed addict and control freak; QuicKeys is the macro software for the rest of us.—DAVID POGUE

KeyQuencer 2.0

RATING: ★★★/6.8 **PROS:** Faster, stabler, more powerful than QuicKeys; uses very little RAM. **CONS:** No "watch-me" mode—requires simple programming; no program-specific macros. **COMPANY:** Binary Software (310/449-1481). **DIRECT PRICE:** $39.95.

QuicKeys 3.5

RATING: ★★★★/8.2 **PROS:** Cleaner interface; new batch-processing feature; tool bars and double-clickable macro icons. **CONS:** Light on new features; still not PowerPC native. **COMPANY:** CE Software (515/224-1995, *http://www.cesoft.com*). **LIST PRICE:** $119.

Virus-Protection Programs

TWO NEW PLAYERS ENTER THE MAC ANTIVIRUS SOFTWARE MARKET

FOR THE FIRST PART OF THE VIRUS software odyssey, Macintosh virus infections were few and far between, and Symantec's AntiVirus for Macintosh (commonly known as SAM) and DataWatch's Virex were the only commercial Mac virus-protection programs to survive in the marketplace. But the infamous Microsoft Word macro virus changed that, infecting Word documents on both Macs and PCs. And a growing number of Word viruses can do all sorts of mischief, such as making it impossible to save your Word document as anything but a template or even encrypting the file itself. As a result, two PC software publishers are entering the Mac market: McAfee Associates with VirusScan 2.0, and S&S International with Dr. Solomon's Anti-Virus Toolkit for the Macintosh.

VirusScan 2.0

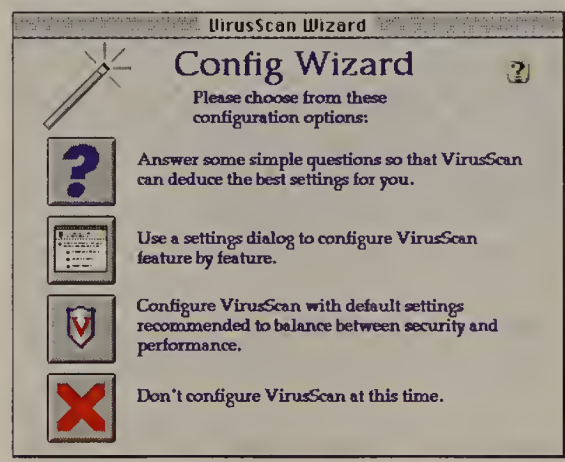
VirusScan 1.0 gave every impression of having been put together in a hurry. The publisher simply licensed the source code for John Norstad's Disinfectant from Northwestern University, then added PowerPC-native code and a few tweaks of the interface. The product got to market quickly but had little to recommend it over the free Disinfectant (see *Reviews*, May 1996).

It is an understatement to describe version 2.0 as new. It looks and feels like a totally different program. A convenient Config Wizard asks you to specify the kind of virus protection you want. Check off the options, and the program's preferences are set accordingly. An Expert mode lets you adjust the settings manually.

VirusScan 2.0 isn't PowerPC native, but it's no slouch as far as scanning speed goes. McAfee uses a reference file to limit scans to new or modified files. Called Fingerprint, this feature works really well. After the initial scan to build the reference file, subsequent scans took just seconds to complete. The one limitation is that only scheduled scans can cover more than a single drive per scanning operation.

VirusScan also installs a system extension (native on Power Macs) that checks files as they're opened and provides an audible alert and on-screen message if a virus attempts to infect your Mac. It also causes an already infected program to quit so it can do no further damage. I encountered one problem: erroneous alerts when backing up with Retrospect 3.01.

McAfee is distributing convenient online updaters for newly discovered viruses. You can also sign up for automatic upgrades at $49 per year. The program itself is available at software retailers and in an online evaluation version from the publisher's Web site, America Online, and CompuServe.



What Kind of Protection Do You Want? McAfee VirusScan 2.0 uses Config Wizard to help you decide the kind of virus protection that's best for your needs.

Dr. Solomon's Anti-Virus Toolkit 7.61

Dr. Solomon's Anti-Virus Toolkit for Macintosh, by S&S International, has a unique approach. The software has been designed to address the fact that we live in a cross-platform world, and many Macintosh owners run Wintel software with a PC upgrade card or Insignia's SoftWindows. So Dr. Solomon's Anti-Virus Toolkit can check for DOS boot sector viruses (although S&S doesn't promise to be able to check for all of the thousands of PC-based viruses).

The program's initial edition (version 7.61 to match its PC counterpart) doesn't include any native PowerPC components, and it doesn't make a scanning reference file. So its scanning speed is considerably slower than the competition's. However, the program ran reliably and used only a modest amount of RAM for its application and system extensions.

Dr. Solomon's Anti-Virus Toolkit comes with a convenient installer and sets up in minutes. The program includes a FindVirus application; a system extension; FindVirus Scheduler; a control panel, MacGuard; and a few preference files. The only customizing you can do is set up the scheduled virus scans. Unlike with VirusScan, however, you can set the program manually to scan more than one drive volume at a time.

The purchase price includes four quarterly updates. Included in the package is a 300-page encyclopedia on computer viruses; unfortunately, it only covers PC-based viruses.

The Last Word

The newest Macintosh virus-protection programs emerge as tough competition for the existing products. While Dr. Solomon's Anti-Virus Toolkit's ability to check DOS disks is a real plus in this cross-platform world, McAfee's VirusScan really shines. It's as fast as the SAM and Virex programs, it's reliable, and its virus-detection ability is easy to update. And VirusScan's handy Config Wizard makes it easy for almost anyone to set up the program. For world-class virus protection with little if any impact on your Macintosh's performance, I recommend McAfee's VirusScan.—GENE STEINBERG

Dr. Solomon's Anti-Virus Toolkit 7.61

RATING: ★★★/6.1 **PROS:** Scans for DOS boot sector viruses; scans files being copied; does scheduled scans; recognizes Trojan horse and Word viruses. **CONS:** Slow; doesn't scan compressed files. **COMPANY:** S&S International (617/273-7400, *http://www.drsolomon.com*). **LIST PRICE:** $85.

McAfee VirusScan 2.0

RATING: ★★★★/7.7 **PROS:** Ultra-easy setup; speedy scans; PowerPC-native extension; does scheduled scans; recognizes Trojan horse and Word viruses; easy updating. **CONS:** Cannot be set to scan more than one disk at a time; doesn't scan compressed files. **COMPANY:** McAfee Associates (408/988-3832, *http://www.mcafee.com*). **LIST PRICE:** $65.

TurboCAD 2D/3D 3.0

CAD FOR EVERYONE

YOU USED TO HAVE TO PAY $4000 for a high-end CAD program, or about $100 for a CAD program that looked like MacDraw with a few more tools and a symbol library. However, you now have another option: at $149, TurboCAD 2D/3D version 3.0 is a nearly high-end CAD program for the Macintosh with an educational-software price.

This package is a significant improvement in price and performance over the 2.0 versions of the TurboCAD 2D and 3D packages. A year ago, TurboCAD didn't have a Power Mac version (a majority of companies using Macintosh CAD software are also, as you would expect, using Power Macintoshes) and, despite its low price, wasn't much of a bargain. All that is changed with version 3: TurboCAD screams on Power Macs as well as on 680X0 systems, it's much more complete, and it's even cheaper.

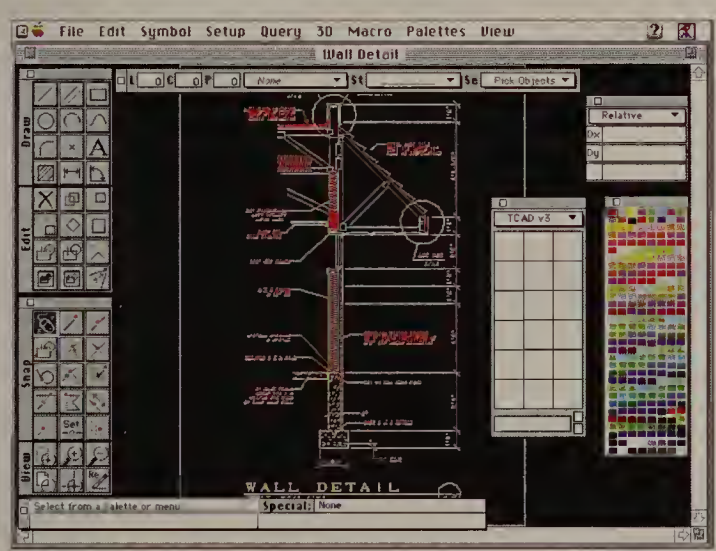
Flat and Fast

TurboCAD's real strength is the 2-D package, which is fast, feature-rich, designed with convenient 3-D extensions, and equipped with a CD-based symbol library for all the common types of 2-D diagrams. Curiously, the symbol libraries for electrical engineering and mechanical applications are even more authoritative than the architectural library (it's adequate but not encyclopedic), although architects are a clear majority of Mac CAD users.

You can learn TurboCAD simply by poking around in the tool-set palettes with a drafting textbook open in your lap (see "Tools for Builders"). Snapping the symbols together into a working drawing is almost a trivial task, explained in a well-designed tutorial. Every action happens instantly, so you can draw and undo a dozen times a minute, which encourages experimentation. In a product with an exact Windows counterpart, this is almost shocking—typically, porting a Windows product whole or even sharing part of the code base makes for languid Mac performance. IMSI specified a common user interface but let the Windows and Macintosh teams go their separate ways on implementation details. The result is complete, nicely documented, and faster than its competitors at most basic operations. It's hard to see how the 2-D CAD system in TurboCAD could be made any more inviting for drafting newcomers, especially at this price.

A Wire-frame World

TurboCAD 3D, despite many new touches, is still primarily oriented toward a wire-frame view of the 3-D world. IMSI's perspective, expressed informally by a program manager, is that the day-to-day design work in CAD is done in 2-D, and that 3-D shows are mostly for the benefit of clients (a fairly accurate appraisal of the situation at most of the firms that use CAD). The 3-D package, like the 2-D, has extensive tool palettes; a display of three 2-D views along with a perspective orientation; and convenient controls for zoom, viewing angle, scale, and lighting. TurboCAD includes a 2-D–to–3-D converter module.



Tools for Builders TurboCAD's giant tool kit (shown here with the 2-D drawing window) pops up almost instantly and lets you assemble working drawings in record time.

Like most parts of TurboCAD, the complete set of wire-frame tools in the 3-D package is delightfully fast. A fast Render command gives you a solid view of your design, and there are convenient architectural tools for adding 3-D stairs, walls, and other elements. Still, making a 3-D walk-through of a building, say, even without such unavailable niceties as realistic wall textures or shadowing, would be more trouble than it's worth. You can, however, use the simple VCR-like animation controls to make an on-disk film of a 3-D simulation that provides a good vision of your design by zooming and rotating as much as needed.

TurboCAD 2D/3D is not really a substitute for Bentley Systems' Microstation V5 or GraphiSoft's ArchiCAD as a companywide architectural drafting solution, but it does have convenient links to IMSI's Windows version of TurboCAD, and an error-free DXF export in 2-D and 3-D. It also supports a long list of plotters that use HPGL and other common protocols.

It's not, however, as complete in 3-D features as current Mac market leader MiniCAD (much less long-standing Mac CAD favorites like ArchiCAD and Ashlar's Vellum), and its programming features are more limited as well—TurboCAD uses a macro recorder that generates BASIC-like text files instead of a tightly integrated general-purpose language. But TurboCAD's street price is comparable to that of a fancy restaurant dinner, and the modest feature deficit actually makes it a comfortable learning environment for beginners. As an additional humble virtue, TurboCAD runs on any Mac from a II on up, in 4MB of RAM using minimal hard-drive space, so if you want to try learning CAD on a hand-me-down Performa from two Christmases ago, for example, it's easily the best product available.

The Last Word

If you do computer-aided design every day for a living, you probably already own another product and you certainly paid more than $149 for it. But if you're just entering the world of CAD or are likely to be only an occasional user of a CAD program, it's hard to beat the ease of use, speed, and simplicity of TurboCAD 2D/3D 3.0.—CHARLES SEITER

RATING: ★★★★/7.4 **PROS:** Impressive speed; rock-bottom price; good 2-D package. **CONS:** Missing high-end 3-D features. **COMPANY:** IMSI (415/257-3000, *http://www.imsisoft.com*). **LIST PRICE:** $149.

Hard Drive Formatters

MAKE YOUR HARD DRIVE FASTER

NEW MACS COME WITH A FREE disk-formatting program from Apple; in the latest models it's called Drive Setup. But when you buy a new hard drive, you'll find that Apple's program doesn't run on non-Apple drives. You're left with whatever program your dealer gives you. Is there any reason to get another hard disk formatter? Well, both FWB and MicroNet claim that their formatters, Hard Disk ToolKit 2.0.1 (HDT) and DiskWorks 3.0.2, can improve the speed of your drive. While FWB delivers, MicroNet unfortunately does not.

Hard Disk ToolKit

HDT puts a number of software components on your hard drive, including a program folder containing no less than 14 items. As daunting as this seems, you only need the HDT application to format and partition your drive. A second application, FWB SCSI Configure, optimizes a hard drive's device driver for custom applications such as desktop video. FWB Tool Manager lets you set up an extension for mounting removable disks and activate a speed boot and a hard disk diagnostic function. Since you need to boot from a system CD or a different drive to format a hard drive, FWB gives you a convenient Crisis Disk that will start up many older Macs. For newer Macs, you need a CD drive or a second hard drive.

DiskWorks

DiskWorks' unique feature is its tuner function, which supposedly helps you fine-tune your drive. Separate profiles should eke out better performance if you use your drive for a special purpose.

DiskWorks' installation process is convoluted, and the interface is clumsy. When you want to erase your drive, it puts up a message stating, "This operation is not possible while the drive is Mounted! Use the Password/Mount button to Unmount all Partitions." There is no such button, nor is such a feature mentioned in the manual. You will eventually discover a command labeled Special Unmount that serves the purpose. Another oddity is the Auto Prepare function, which gives you a default option of preparing a disk array, not a regular hard drive. Once you get past the interface quirks, the actual drive-formatting operation works without further difficulties.

DiskWorks supports desktop PowerPC Macs and compatibles. There's no start-up disk for models without a CD drive or second hard drive, and there's no extension for mounting removable disks.

The Benchmarks Tell the Tale

On the test bench, Macworld Lab put Apple's Drive Setup in competition with DiskWorks and HDT on an Apple-label Conner 1GB drive. Additional tests pitted the other two programs against each other on Micropolis and Quantum drives.

Drive performance among the products was very close in such routine tasks as copying and duplicating files. Our 4D database search tests gave both Drive Setup and HDT a minor advantage over DiskWorks. In the Photoshop tests, HDT was noticeably faster than both Apple's Drive Setup and DiskWorks in opening and saving large files.

HDT didn't fare as well with my PowerBook 5300ce's hard drive. Even though I used the program's drive-customization feature, the 1.1GB drive still ran slower than it did with Drive Setup. FWB's technical-support people said they couldn't guarantee top speed with Apple drives, but added that they could do better with third-party drives.

The Last Word

I was disappointed with MicroNet's DiskWorks. The promise of tuning your hard drive for higher speed wasn't fully realized, and its awkward installation process and interface will surely be difficult for novice users. While the modular setup of FWB's Hard Disk ToolKit seems unduly complicated, HDT is fast, reliable, and can actually tweak a hard drive to run faster. For maximum hard drive performance, give it a try.—GENE STEINBERG

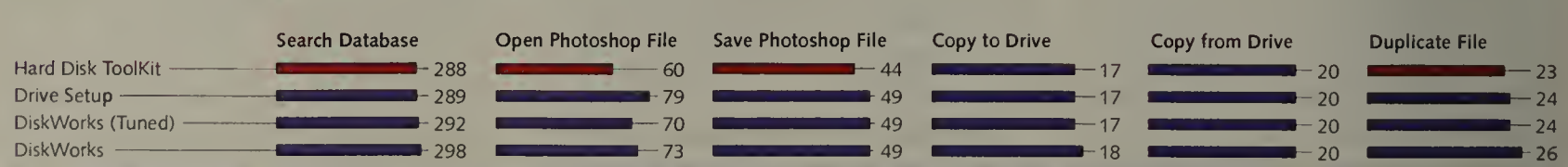
DiskWorks 3.0.2

RATING: ★★/4.9 **PROS:** Easy-to-use application. **CONS:** Mediocre performance; only supports desktop PowerPC Macs and compatibles; awkward installation; interface quirks; fine-tuning feature runs very slowly. **COMPANY:** MicroNet Technology (714/453-6100, *http://www.micronet.com*). **LIST PRICE:** $299.

Hard Disk ToolKit 2.0.1

RATING: ★★★★/7.0 **PROS:** PowerPC-native driver; speeds up hard drive performance; supports IDE drives; convenient boot disk. **CONS:** Mediocre performance on stock PowerBook; confusing number of software modules. **COMPANY:** FWB (415/463-3500, *http://www.fwb.com*). **LIST PRICE:** $199.

Which Formatter Is the Fastest?



Behind Our Tests Drives were connected to the built-in external SCSI bus of a Power Mac 7500/100 running System 7.5.3. All to/from Finder file transfers were to a 1GB Quantum Empire connected to the internal SCSI bus. Test results shown here are for the Conner drive. Tests conducted on a Micropolis and a Quantum drive showed similar results. **—Macworld Lab testing supervised by Jeff Sacilotto**

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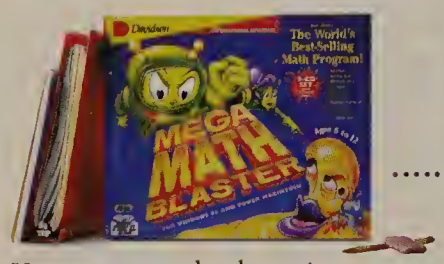
No other computer in the world makes it this easy to create your own home movies. Avid Cinema software guides you step by step through the entire moviemaking process, from planning shots to editing video to publishing your finished movies.



Your personal education.

It comes with some of the most popular educational software already installed and runs hundreds of other educational programs that make learning more fun—to help kindergartners learn to read and write, high school kids prepare for college or grown-ups master a second language.

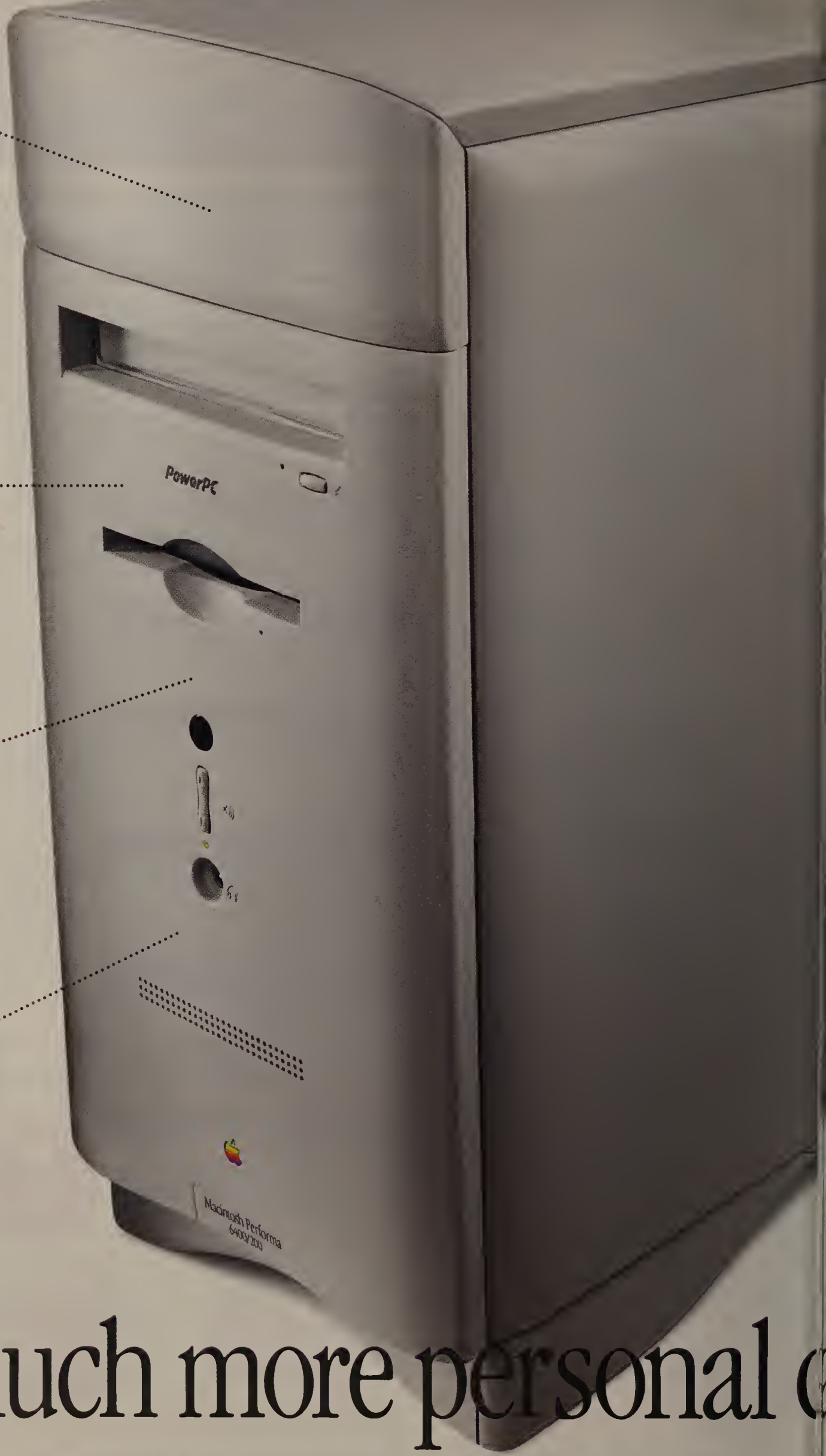
Your personal finances.

The Performa 6400 computer brings the point-and-click simplicity of a Macintosh to a wide range of software for managing your family finances—programs like Quicken that help you do your taxes, track your investments and balance your checkbook.

Quicken®

Your personal interests.

We've even made the Internet more personal by including your own Personalized Internet Launcher—a service from Apple that automatically searches the Internet and brings to your screen the newest and best web sites that interest you most.



How much more personal c

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Your personal computer.

No, that cozy-looking piece of hardware isn't a newfangled ottoman. But you'll be amazed at how comfortable it feels in your home. It's the new Performa 6400 tower—built around the PowerPC™ 603e RISC chip running at 180 or 200 MHz with up to 2 gigabytes of hard drive space, and shown with the new Apple® Multiple Scan 15AV monitor and the Apple Color StyleWriter® 2500.†

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Every Performa model comes with Macintosh PC Exchange,™ allowing you to read from and write to DOS disks. Add a program like SoftWindows™ or a PC compatibility card, and you can even bring work home from the office and run your Windows applications at the touch of a key.

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That's why the Performa 6400 comes with today's most advanced multimedia features. Including an 8x-speed CD-ROM drive for the smoothest game animation and 16-bit stereo sound for the clearest listening experience. And with the addition of Avid® Cinema software, creating your own home movies becomes unbelievably easy.

It also brings the Internet home with a 28.8 Kbps modem and all the software you need not only to get up and surfing on the Net,* but to easily create your own web page as well.

And although the life span of some computers may appear to extend just beyond that of the average goldfish, we've loaded the Performa 6400 with ample power and plenty of expansion options so you and your family will enjoy it for years to come.

It's everything a family computer should be. For the name of the Apple reseller near you, and for information on special holiday promotions, call 800-446-3000, extension 100. Or visit us on the Internet at www.apple.com/

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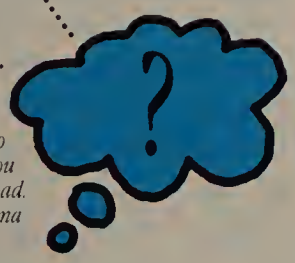
There's more than enough power for today's applications and plenty of expansion options that make it easy to add functionality no matter what you want to do—now, and down the road. When your family grows, your Performa grows with you.



an a personal computer get?

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Cambridge SoundWorks Speakers

SOUND EQUALS THAT OF CONVENTIONAL SYSTEMS

THE SOUNDWORKS AND MICROWorks speakers, from Cambridge SoundWorks, are multimedia speakers with a pedigree. The designer, Henry Kloss, has been developing loudspeakers for nearly 40 years and was previously involved with a number of well-known audio manufacturers, including such names as AR, KLH, Advent, and Kloss Home Video. Among audio enthusiasts he's known as an engineer who can design high-quality audio products at affordable prices, and these speakers live up to that reputation.

Wonderful illustrated manuals make setup a snap. In addition to the usual assortment of cables, Cambridge SoundWorks provides small desktop stands and an assortment of tape and screws, so you can mount the speakers either on a wall or at the side of your monitor. Both systems are black or computer-beige three-piece units, with two desktop satellites and a woofer module that contains a three-channel amplifier to feed all three components. The woofers in both systems are vented, a technique that uses a hollow tube to enhance bass performance.

In order to check the sound-reproduction capabilities of these speakers, I listened to CD-ROM games, plus classical and popular audio CDs. I also used a test CD to briefly examine the ability of the woofer modules to deliver good output at low frequencies.

SoundWorks

The SoundWorks speakers are surprisingly small. The desktop satellites are square boxes, 3.5 inches wide. The woofer module is less than 9 inches high. The three-channel amplifier puts out a total of 18.5 watts, which is OK for a small room, but not much for a larger home office or living room.

You can set bass output via a level control, but both the SoundWorks and the MicroWorks lack tone controls. To change sound balance, you must move the desktop speakers around a bit so they don't point directly at you. The woofer can be placed on the floor between the speakers but, like most woofer modules, works best when placed in the corner of a room. Sound quality was good, with crisp, clear midrange and treble, and a healthy thump when the program material had lots of bass.

The SoundWorks system has only one input jack for an audio source, so if your Mac has an external CD-ROM and you want to hear audio CDs, you'll have to consider going to a local electronics dealer and buying a sound-mixing unit.

KEVIN CANDLAND

SoundWorks (left) and MicroWorks

MicroWorks

The MicroWorks system is larger than the SoundWorks system in every dimension. The desktop satellite speakers are 4 inches square, and the woofer module is 17.5 inches high. Output power is specified at 66 watts for the three channels combined. The higher power and larger speakers pay off. You can play this system much louder than you can play the SoundWorks; in fact, I got more than I bargained for in my home office before I turned the volume down to a more comfortable listening level.

As with the SoundWorks, a level control on the MicroWorks woofer module sets optimum bass performance. You also get a second input jack for an external CD-ROM or other sound source. That's a real convenience if you want to use the speakers as a home audio setup, but it would be nice if you could switch from one input source to the other, rather than have both on at the same time.

In its advertising, Cambridge SoundWorks invites you to compare the MicroWorks with multimedia systems costing twice as much, so I took the company up on it. I compared the MicroWorks with the top-rated $699 Bose Acoustimass multimedia system (see "Multimedia Speakers," *Macworld*, March 1996). In a series of back-and-forth comparisons, it was clear that the MicroWorks and Bose systems were in the same league in terms of sound quality. The MicroWorks' sound is rich and full, with good bass. The Bose system had slightly softer treble and a somewhat warmer sound, which some listeners might prefer. The MicroWorks system, however, seemed able to play a bit louder without distortion.

The Last Word

It's always a pleasure to have two high-quality products to examine, and the contenders from Cambridge SoundWorks rank among the best computer speaker systems *Macworld* has tested. Both systems would even provide satisfactory performance in a conventional home audio setup. But if you can afford the extra $130, I definitely recommend the MicroWorks system. In terms of price for performance, it's in a class by itself.—GENE STEINBERG

MicroWorks

RATING: ★★★★/8.8 **PROS:** Excellent sound, suitable for home use; convenient handheld volume control; has second audio input for external CD drive. **CONS:** Lacks tone controls. **COMPANY:** Cambridge SoundWorks (617/332-5936, *http://www.hifi.com*). **LIST PRICE:** $349.

SoundWorks

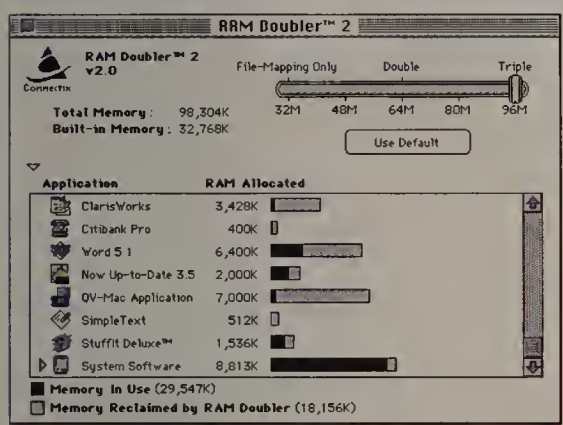
RATING: ★★★★/7.6 **PROS:** Very good sound; convenient handheld volume control. **CONS:** Lacks input for external CD drive or other component; lacks tone controls. **COMPANY:** Cambridge SoundWorks (617/332-5936, *http://www.hifi.com*). **LIST PRICE:** $219.95.

RAM Doubler 2.0

RAM-TRIPLING CONTROL PANEL

RAM DOUBLER 2 DOESN'T MERELY double your RAM—it now *triples* it. On a Mac with 16MB of actual RAM, you can simultaneously run System 7.5.5, ClarisWorks, Netscape Navigator 3, America Online, Microsoft Excel 5, QuarkXPress, FileMaker Pro, Claris Emailer, Now Up-to-Date, InfoGenie, Quicken 6, and even Adobe Photoshop, with RAM room to spare.

RAM Doubler still doesn't let you allot all your newfound RAM to a single program. If you couldn't run Photoshop before, you won't be able to run it with RAM Doubler. Instead, RAM Doubler does what it has always done, but better: it compresses unused pockets of RAM so that now three times as many programs can run simultaneously.



On Today's Panel The new RAM Doubler 2 control panel features a bar graph that illustrates how much RAM typical programs generally waste—to be reclaimed by RAM Doubler.

If that caveat, and the new version's 8MB-of-real-RAM requirement, don't disappoint you, you're likely to be thrilled by this update. RAM Doubler 2's faster RAM-compression scheme reduces even the tiny 3 percent speed penalty of its predecessor; you can't feel any slowdown, and the stopwatch finds only a 1-second slowdown on some 1-minute tasks.

But banishing the "not enough memory" message is not all RAM Doubler does. If you've ever used the Get Info command on a native-PowerPC application, you've discovered that turning on virtual memory greatly decreases these programs' memory appetites. This quirk of virtual memory, called *file mapping*, means that a native-PowerPC program copies into RAM only the computer code it needs at the moment.

But virtual memory uses up a huge chunk of hard drive space, slows down the Mac, and voraciously consumes a PowerBook battery's charge. Fortunately, RAM Doubler turns on file mapping without virtual memory's disadvantages. The new control-panel slider lets you specify how active you want RAM Doubler to be, from "File Mapping Only" to "Triple."

(Since RAM Doubler 2 usually imposes no speed penalty for its RAM-tripling feature, what's gained by setting the slider to "File Mapping Only"? Connectix admits that the primary reason is psychological: so many original RAM Doubler users requested it that the programmers felt compelled to oblige.)

You can't install a program that performs such deep-seated, OS-wide magic without worrying about incompatibilities. Indeed, Connectix's tech-support bulletin boards contain an assortment of glitch reports; and vague, unconfirmed rumors of instability have circulated in the past.

Yet history has shown that most RAM Doubler stories have happy endings. First, the Connectix online help staff is second to none. Virtually every customer complaint on those bulletin boards is promptly resolved, usually by upgrading to a newer version of some extension—or of RAM Doubler itself. Second, when Connectix does discover a bug or incompatibility, it quickly solves the problem with a free update. Finally, if you can't get the program to work smoothly, the company will refund your money.

The Last Word

If you'd like to keep more programs running, it's easier and cheaper to install RAM Doubler than RAM. And if your Power Mac already has plenty of RAM, RAM Doubler will bless you with more hard drive space as well (because you can turn off virtual memory). Either way, it's more tempting than ever to be skeptical of RAM Doubler's claims—and more pleasing than ever to discover that they're absolutely true.—DAVID POGUE

RATING: ★★★★/8.6 **PROS:** Outstanding record of technical help and bug-fixes; less expensive than actual RAM; additional RAM savings on PowerPC machines. **CONS:** Not appropriate for digital video applications; tiny slowdowns possible. **COMPANY:** Connectix (415/571-5100, *http://www.connectix.com*). **LIST PRICE:** $99.

But wait, there's more.

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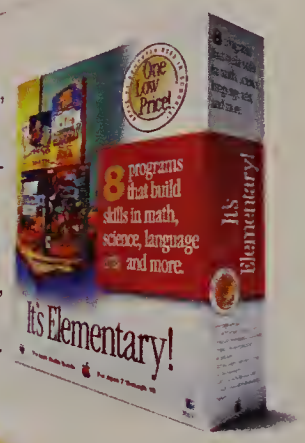

"College in Mind?" Includes 8 top programs that will help your kids get organized and ready for college by sharpening their test-taking, writing and interview skills.

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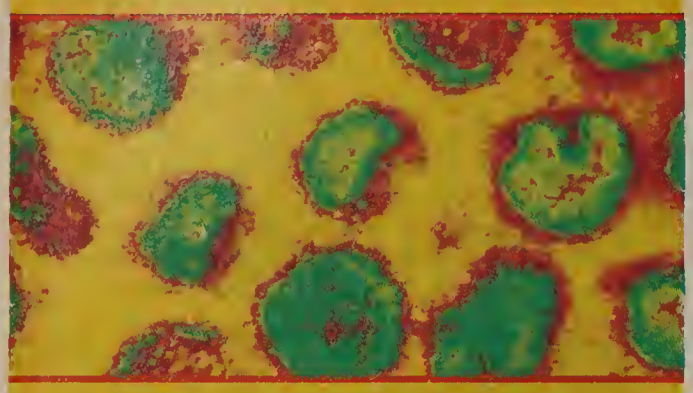

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MacUser RATED 3½ August 1995

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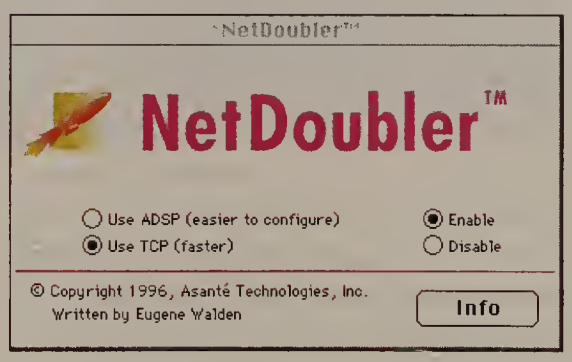
NetDoubler

BOOSTS NETWORK TRANSFER SPEEDS FOR LARGE FILES

EVEN THE SPEEDIEST POWER Macs can slow to a crawl when moving large chunks of data across a network, and technologies such as Open Transport and Fast Ethernet have done little to help. Asanté's network acceleration utility, NetDoubler, sets out to solve this problem. Though it's not ideal for every network, NetDoubler lives up to its name—and then some—in environments where large files rule the LAN.

NetDoubler accelerates data transfers between Mac clients and servers using AppleShare or Personal File Sharing by intercepting the normal ATP (AppleTalk Transport Protocol) requests and using a more efficient protocol, either ADSP (Apple Data Stream Protocol) or TCP/IP. This, along with software caching, results in higher transfer rates for large files. The process accelerates all types of file accesses, not just Finder copies, but since NetDoubler doesn't affect TCP/IP traffic, the performance of your E-mail, FTP, and Web software will be unchanged.



Click 'n' Double NetDoubler's configuration is amazingly straightforward: simply enable the acceleration and select the appropriate protocol.

Installation places both client and server components on your Mac. The client software, a control panel that requires about 1MB of RAM, lets you perform accelerated transfers to and from any other Mac running the server component, a faceless application that requires about 2.5MB of RAM.

The control panel is extremely simple. One pair of radio buttons allows you to dynamically enable or disable the acceleration (no restart is required), and a second pair of buttons selects the protocol. Once installed, NetDoubler works almost flawlessly. I encountered one conflict with Apple's unsupported release of the LaserWriter Bridge for Open Transport; Asanté confirmed that it will address this problem in a maintenance release.

To see how NetDoubler benefits the average user, I performed network transfers on Power Mac 6100/60's using built-in Ethernet. Employing the ADSP protocol, I saw a 40 to 55 percent reduction in transfer times when copying large (6MB to 60MB) files. TCP/IP speeds were even more impressive: transfer time was reduced 50 to 65 percent. NetDoubler also accelerates Opens and Saves in Adobe Photoshop 30 to 50 percent.

It's important to note, though, that you get performance boosts only when working with large files. Copying a folder of 5K files took 30 to 50 percent *longer* using NetDoubler than with standard AppleTalk, due to the additional overhead NetDoubler incurs (Asanté advises that you'll see speed improvements with files larger than 256K). Thankfully, you can temporarily disable NetDoubler if your work demands it.

Although NetDoubler offers an appreciable performance improvement when using modest hardware, it really shines with PCI Macs and high-speed networks. I repeated my network tests on a high-end network: an Asanté Plug-and-Play 100TX hub connecting two Power Mac 8500's equipped with AsantéFast 10/100 fast Ethernet cards. File transfers took 60 to 70 percent less time with ADSP, and were five times faster using TCP/IP. Photoshop Opens and Saves took 45 percent less time with ADSP and 55 percent less time using TCP/IP. As with the slower setup, small files took longer to move—in this case, anywhere from 50 to 65 percent.

The Last Word

NetDoubler proves even better than its name promises. Although everyday users will see little benefit, prepress workers and others who regularly move large files should rejoice. In these environments, where time is money, NetDoubler is a wise investment.—J.W. DAVIS

RATING: ★★★★/8.7 **PROS:** Easy to install; seamlessly boosts performance. **CONS:** Degraded performance with small files. **COMPANY:** Asanté Technologies (408/435-8388, *http://www.asante.com*). **LIST PRICE:** Single-user version $99; $69.95 per user for a 20-pack.

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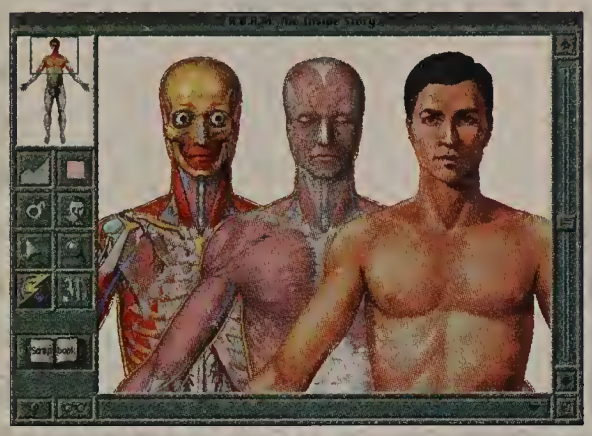
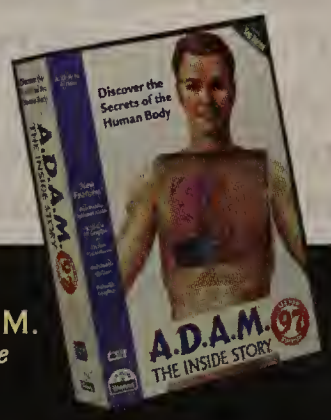


***Some disassembly required.**



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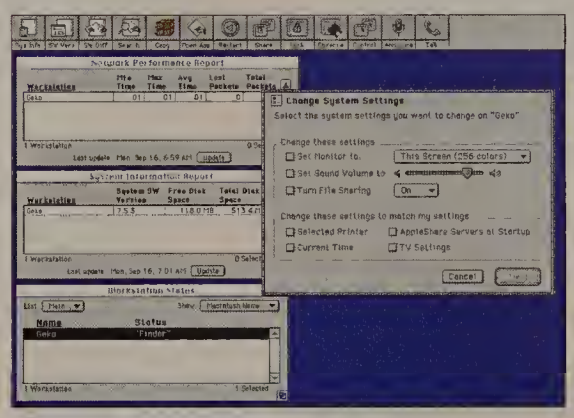
Apple Network Administrator's Toolkit

EASY-TO-USE CLASSROOM NETWORK ADMINISTRATION

ADMINISTERING A NETWORK IN A classroom or lab environment, where groups of users share many Macs, can be challenging, particularly if configurations must change regularly to suit different user groups. The Apple Network Administrator's Toolkit simplifies both administering and proctoring by letting you distribute software and configure systems remotely and then interact with students.

The Network Administrator's Toolkit is actually a bundle of three Apple workgroup tools: At Ease for Workgroups 4.0, Network Assistant 2.0, and User and Group Manager 1.0. The package includes a single CD and a well-written administrator's guide. Lacking is any kind of end-user documentation, which is a shame because many features of the At Ease user interface are not documented in the administrator's guide.



Network Assistance The Network Assistant component of the Apple Network Administrator's Toolkit can report on the configurations of student machines, and lets you remotely set system settings of one or more Macs simultaneously.

At Ease for Workgroups gives you precise control over the programs, files, peripherals, and menu options each classroom machine can access. Unfortunately, it requires an AppleShare 3.0 server; personal file sharing isn't supported. You choose one of three environments—At Ease panels, a restricted Finder, or an unrestricted Finder—and then permit or restrict individual access rights. Other settings you can specify include accessible file servers, printers, applications, documents, CD titles, and menu items. You can also set page limits for printers, set locations for saving files, and optionally require user-ID or password log-in.

Network Assistant gives you hands-on control of student machines, providing an interface through which you can share, view, and control screen sessions. This is the most intriguing aspect of the entire Toolkit suite. With the interactive control feature, you can project a shared screen from any one Mac onto all student machines, monitor up to four student screens at a time, control any individual machine, make text or voice announcements, and carry on text and voice conversations with individual students.

You can also use Network Assistant to select any student machines and apply an operation to them en masse. You can copy or delete files, change system settings, and measure network performance. Network Assistant can also query each machine to generate management reports listing software versions, disk contents, and equipment configurations.

User and Group Manager provides remote control of the Users & Groups control panel on file servers, simplifying the task of administering user lists on multiple servers. It supports the At Ease for Workgroups server, AppleShare file servers, and SoftArc's FirstClass file servers. It doesn't work with personal file sharing. Using a drag-and-drop interface, you can view, rearrange, and copy users on and between remote servers.

The Last Word

While the three components of the Apple Network Administrator's Toolkit are not highly integrated, as a suite they automate the most important chores of classroom network management. However, this is not a general-purpose network-administration tool and won't be useful in business environments except in-house education groups. But for classroom settings, it's the teacher's pet.—MEL BECKMAN

RATING: ★★★★/7.2 **PROS:** Straightforward, easy-to-use interface; centralizes important administrative chores; monitors multiple screens simultaneously; voice and text messaging. **CONS:** At Ease for Workgroups requires AppleShare server; lacks end-user documentation. **COMPANY:** Apple Computer (408/996-1010, *http://www.apple.com*). **COMPANY'S ESTIMATED PRICE:** Ten-user license $599.

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Spell Catcher 1.5

RESURRECTED THUNDER 7 IS STILL MORE THAN JUST A SPELLING CHECKER

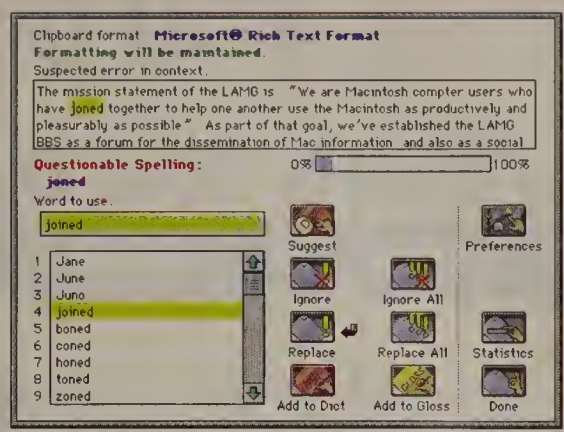
BECAUSE OF THE DEMISE OF BASEline Publishing, its excellent interactive spelling checker, Thunder 7, was off the market for a few years. Casady & Greene recently revived it, and the newly named Spell Catcher 1.5.6 is as good as ever. The program has changed little from the final versions of Thunder 7, with the update consisting mainly of bug-fixes, better compatibility with current Macs, and a few new text-manipulation modules. As before, Spell Catcher works in any application you choose, adding its menu to the end of the menu bar.

Spell Catcher is primarily an interactive spelling checker, watching your keystrokes and alerting you when you make a mistake. A hot key then brings up a correction window with a numbered list of guesses at the word you meant to type. Pressing a number selects the corresponding word from the list, and Spell Catcher backs up the cursor and replaces the misspelled word. For words you misspell frequently, or for common typographical errors, the program quickly and unobtrusively fixes the error with no alert and no intervention.

This same automatic text replacement is featured in the wonderful Shorthand Glossary, which allows you to type an abbreviation in place of a word, phrase, or paragraph. For example, if I type **allinfo**, Spell Catcher expands it to my name, address, phone numbers, and Internet addresses, saving me a lot of typing. Like most spelling checkers, the program will also check a highlighted selection, which is handy for correcting errors in text you've already typed.

In addition to the main dictionary and a thesaurus, the program comes with legal, engineering/scientific, and medical dictionaries, each of which adds about 20,000 specialized words. The supplemental HTML dictionary includes most common tags, making it useful when editing Web-page source code. Unfortunately, Spell Catcher still flags URLs as errors because of their odd punctuation.

A feature called Ghostwriter records all of your keystrokes so you can reconstruct unsaved work after a system crash or power failure. Other modules modify



Find It, Fix It The Check Selected window shows mistakes, in context, and lets you fix one or all instances of the error.

capitalization in selected text, form paragraphs with hard-wrapped text, and change typewriter-style quotation marks to typographer's curly quotes—a boon if you post a lot of Internet mail.

A native PowerPC version would improve Spell Catcher's performance; sometimes the program takes several seconds to display the right guess for a misspelled word. The main dictionary contains a meager 86,000 words—people with large vocabularies will want more—and the size of the thesaurus could also be beefed up.

The program has a few incompatibilities, most notably with the Apple Menu Options extension, which is sometimes rendered inoperative, and a cosmetic conflict with the software for Big Island's YoYo. Tech support is also ripe for improvement; my calls weren't returned for two days. Casady & Greene says it is hiring more technicians and promises better response in the future.

The Last Word

Using Spell Catcher is addictive. Since I'm a none-too-expert typist, Spell Catcher effortlessly catches and eliminates my common typos, and the Shorthand Glossary saves me a huge amount of typing every day. I wouldn't want to be without it, and after you try it, you probably won't, either.—TOM NEGRINO

RATING: ★★★★/7.8 **PROS:** Works in any program; excellent glossary; useful text manipulation. **CONS:** Minor incompatibilities; needs bigger dictionary and thesaurus; no native version. **COMPANY:** Casady & Greene (408/484-9228, *http://www.casadyg.com*). **LIST PRICE:** $59.95.

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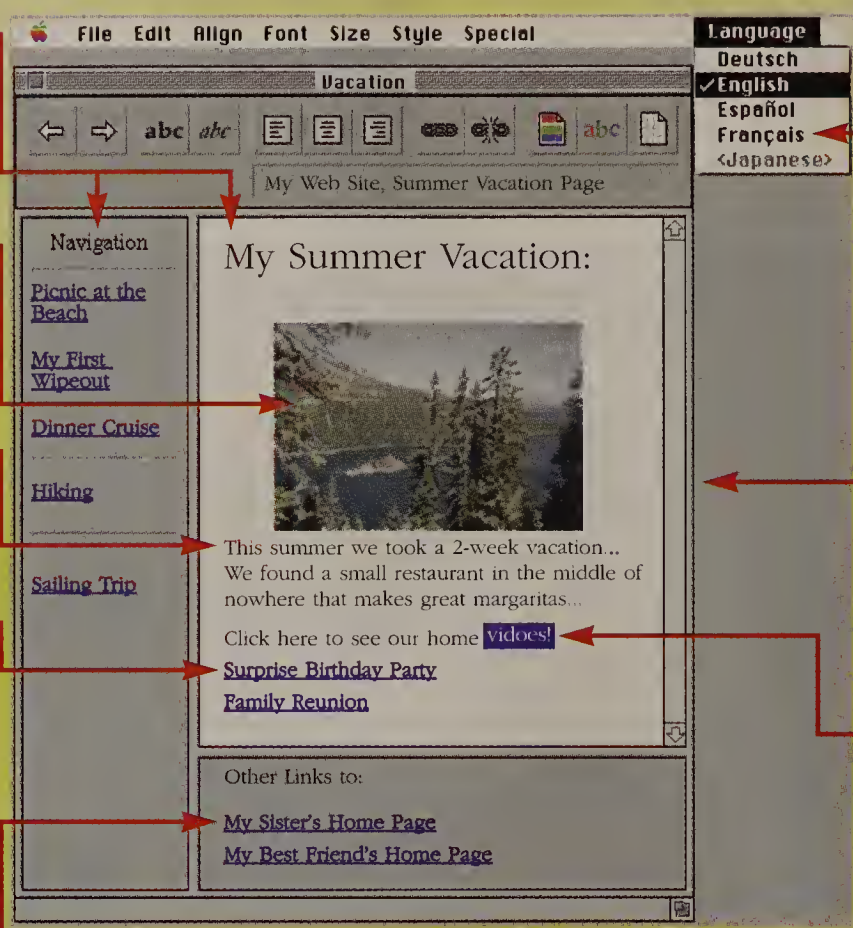

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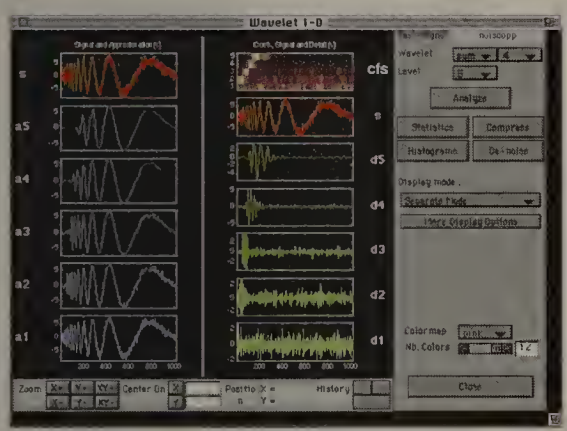
MATLAB Toolboxes

ANALYSIS TOOLS ON STEROIDS

MUCH OF THE POWER OF MATLAB 4.2, The MathWorks' numeric-symbolic math program, lies in its collections of commands for special-purpose computations. Wavelet Toolbox 1.0 and Statistics Toolbox 2.0 let engineers and scientists easily perform computations that would otherwise require the efforts of an applied mathematician, an expert C programmer, and a specialist in wavelets and stats.

Statistics Toolbox is a library of 200 calculations that are accessible as simple commands from a MATLAB command window (your scratch pad for MATLAB code entry). Besides all the standard functions for descriptive statistics, regression, correlation, and ANOVA, the toolbox offers a set of functions for Design of Experiments, Principal Components Analysis, statistical process control, and bootstrap and resampling stats.



All Quiet on the Wavelet Front The decomposition here shows the MATLAB Wavelet Toolbox isolating and discarding noise from a chirp-type signal.

Although beginning statistics students will likely do better with an all-in-one, menu-based package, a professional statistician with modest programming skills can do amazing things with these tools. At the simplest level, you can use MATLAB, the MATLAB compiler, and Statistics Toolbox to write efficient, stand-alone programs that have stunning graphics and can handle huge data sets. At a more advanced level, you can combine these tools with parts of the MATLAB Fuzzy Logic ($895) and Neural Network ($1676) toolboxes to generate self-modifying statistical tests, then compile them as a stand-alone program. Only a true S-language expert (S is a special programming language for statistics) could do anything comparable, and even then it would take vastly more effort.

MATLAB's other new set of tools introduces wavelets, the hottest applied-math topic in a decade and the tool of choice not only for such routine tasks as removing noise from a waveform, but also for wave pattern recognition.

In short, wavelet methods are the most generally useful applied-math technique, and the MATLAB Wavelet Toolbox is the best set of wavelet tools from any math vendor (the Mathematica tools are impressive, but MATLAB's execute faster and are easier to learn). The documentation, interface, and scope of the tools set a standard that's hard to beat. The large, user-friendly manual is a perfect complement to the included text, *Wavelets and Filter Banks.* The interface, in contrast to Statistics Toolbox's (which calls for simple programming), lets you explore wavelets interactively through a series of screens with buttons to direct your computing options—a gentle introduction to this formidable subject. And for professionals who know wavelets and want to get going quickly, the toolbox includes the seven most useful families of wavelets for transforms; all are easily extended, and new types are easy to add.

The Last Word

MATLAB widens its lead over other math systems. Statistics Toolbox gives statisticians willing to do minimal programming access to tremendous power, and Wavelet Toolbox gives *anyone* access to a wide range of new computations.—CHARLES SEITER

Statistics Toolbox 2.0

RATING: ★★★★/7.5 **PROS:** Fast; complete; adaptable; great choice for large data sets. **CONS:** Long learning curve. **COMPANY:** The MathWorks (508/647-7000, *http://www.mathworks.com*). **LIST PRICE:** $395.

Wavelet Toolbox 1.0

RATING: ★★★★★/9.3 **PROS:** Best wavelet software in any math system; complete; efficient; nicely documented. **CONS:** None. **COMPANY:** The MathWorks (508/647-7000, *http://www.mathworks.com*). **LIST PRICE:** $895.

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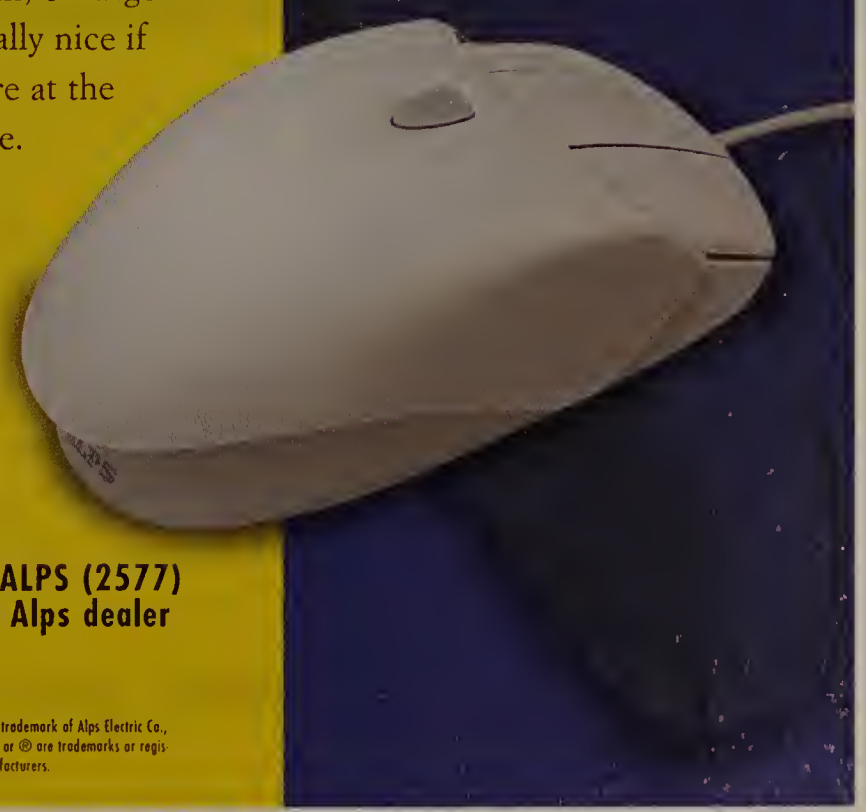

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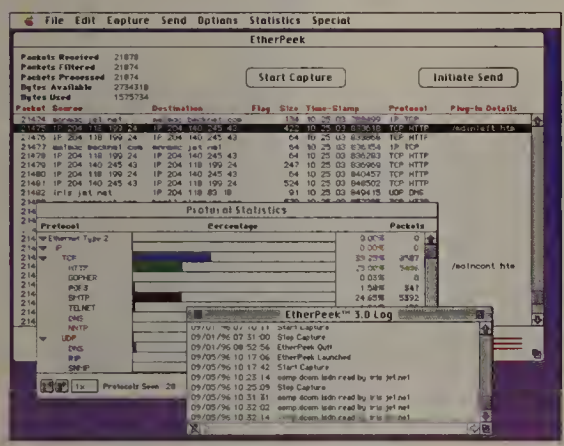
EtherPeek 3.0

ETHERNET NETWORK ANALYSIS MADE EASY

ONE NETWORK ADMINISTRATOR describes locating problems on his LAN as "like finding a needle in a haystack in a hurricane." With maxed-out servers, wide area networks, and Internet connections all dumping traffic onto the wire at mind-numbing rates, getting a clear picture of LAN activity and performance isn't easy. AG Group's EtherPeek network analyzer has always been a big help in such situations, and with the slew of enhancements in version 3.0, it's bound to become your right hand. The new version adds support for PCI Ethernet cards (including 100BaseT), automatic name resolution, real-time utilization graphs, customizable views, traffic statistics by protocol, AppleScript and speech notifications, and plug-in modules. The price is up $200 from version 2.0, but the enhancements are well worth it.



A Peek at the New Automatic name resolution, protocol-statistics bar graphs, and plug-ins that let you monitor such things as Usenet newsgroup reading and Web surfing are among EtherPeek's best new features.

The package provides the EtherPeek analyzer program, a set of interface modules for various brands of network hardware adapters, and a library of protocol-specific filters and decoders. A well-written manual explains how to use the analyzer in various situations. In addition to TCP/IP, DECnet, NetWare, Banyan, XNS, and IPTalk protocol suites, version 3.0 adds support for IPv6, ICMPv6, DHCP, and IGRP. The new version also works with OpenTransport 1.1. Context-sensitive documentation for each protocol lets you call up detailed protocol definitions on the spot.

EtherPeek works by eavesdropping on network traffic, capturing and categorizing every packet. Filtering tools let you extract only the packets you're interested in—by protocol, type, address, or contents. Every protocol includes packet decoders to display the contents of any packet formatted down to the bit level. You can use the supplied filters or make your own.

In addition to filtering, you can set a "trigger" to start and stop capture only when certain events occur. A trigger can also generate a sound, message, pager notification, or AppleScript event. When network traffic exceeds certain configurable thresholds, or when security-sensitive events, such as a new node or protocol, occur, an alarm feature uses these same techniques to notify you. Statistical bar graphs, by node or protocol, let you detect network congestion and traffic bottlenecks. A real-time graphic network utilization monitor displays overall network efficiency and the rate of collisions and error conditions, letting you easily monitor the overall health of your LAN.

Two new features stand out. The first, automatic name resolution, translates network station numbers (either hardware addresses or protocol addresses, such as IP or AppleTalk) to names, making it much easier to identify network entities. The second, plug-in analyzer modules, makes EtherPeek highly extendable. Five plug-ins are supplied: duplicate IP address detection, AppleTalk and IP detail extraction, and Web URL and Usenet newsgroup monitoring. These last two plug-ins let you monitor the two most common bandwidth hogs. Other features include a traffic generator (essential for verifying network configurations and performing stress tests) and various postcapture tools.

The Last Word

AG Group sells EtherPeek as a standalone product or in various bundles with its other network-management tools. The products work together well and are certain to make your network-management life easier.—MEL BECKMAN

RATING: ★★★★★/9.1 **PROS:** Low-cost alternative to dedicated network analyzers; automatic name resolution; plug-in expandability. **CONS:** None. **COMPANY:** The AG Group (510/937-7900, *http://www.aggroup.com*). **LIST PRICE:** $995.

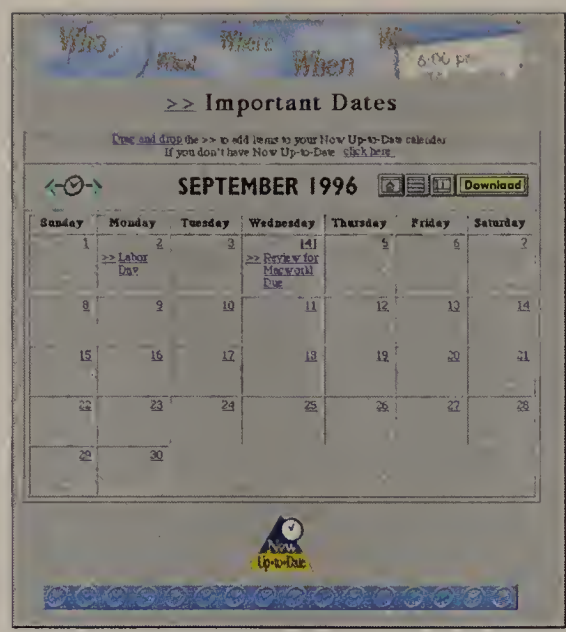
Circle 170 on reader service card

Now Up-to-Date Web Publisher

PUBLISH YOUR CALENDARS ON THE WEB

SOMETIME LAST YEAR (IN OTHER words, in the Web's distant past), if you needed to publish an online calendar that actually *resembled* a calendar, you had to draw it as a graphic or laboriously code it in HTML. In either case, you ended up with files that were static and difficult to update. Now Up-to-Date Web Publisher solves this problem by helping you create functional HTML calendars and contact lists with real-time updating. To take advantage of this product, however, you'll need a full-time connection to the Internet. Coupled with the scant documentation, that requirement makes setup a daunting task for the casual user. If you don't have a dedicated server—or if you need to customize your Web pages—be prepared for a laborious update process.

Web Publisher extends the capabilities of Now Software's contact and calendar server software by letting them work over TCP/IP and by publishing their contents in HTML. If your server is on the Web, Web Publisher generates a set of HTML documents whenever it receives a request; if you don't have a dedicated server, you'll need to export static HTML pages.



Pull the Plug Though some users will find Web Publisher a great time-saver, others will be annoyed by the Now logo that appears on their Web pages.

Even with a dedicated server, you'll still need to export the files if you don't like the way Web Publisher outputs your information. Though you can change the headers and footers, your customization power ends there. If you want to remove the Now logo and link that appear automatically on each page, you'll need to use an HTML editor to alter the files. Though the exported files are very small, you end up creating a lot of them if you have even a moderate amount of data. The good news is that when users access these HTML files via a Web browser, they can click on a calendar event and view the associated names, businesses, and URLs. Not only can you link information to these calendars, but users can drag data from a Web-published calendar or contact list into their Now Up-to-Date or Now Contact software.

The Last Word If you can take advantage of Now Up-to-Date's automatic publishing and don't mind giving Now Software a plug, this may be the simplest way to publish a calendar or contact list on the Web; just be prepared to wait if you have to export HTML files.—NICK A. TOPOLOS

RATING: ★★★/6.6 **PROS:** Automatically creates HTML versions of calendars and contact lists; can drag and drop events and contacts from the Web. **CONS:** Needs a dedicated server; scant documentation; limited customization abilities; time-consuming export process. **COMPANY:** Now Software (503/274-2800, *http://www.nowsoft.com*). **ESTIMATED STREET PRICE:** $129.95.

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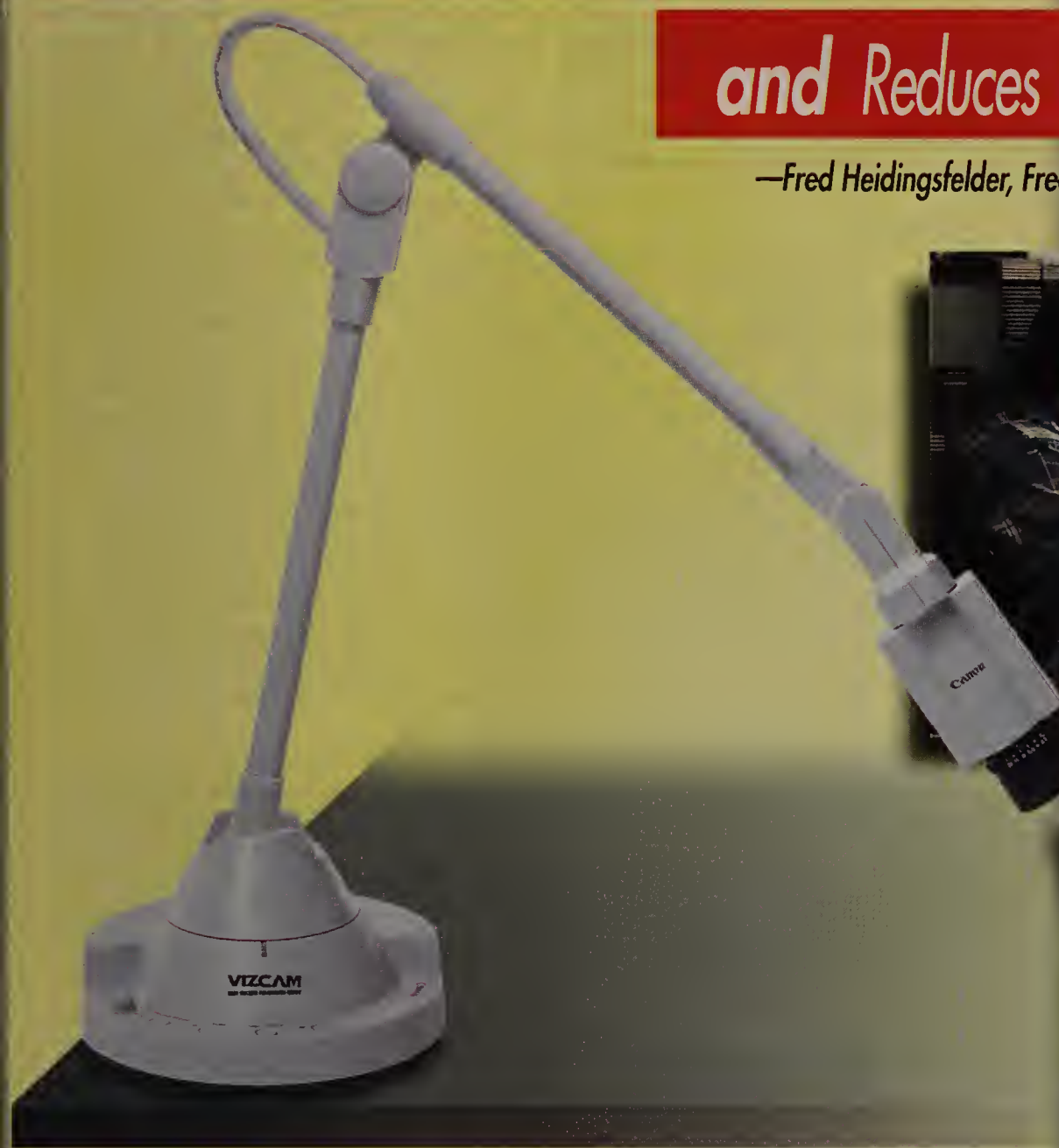
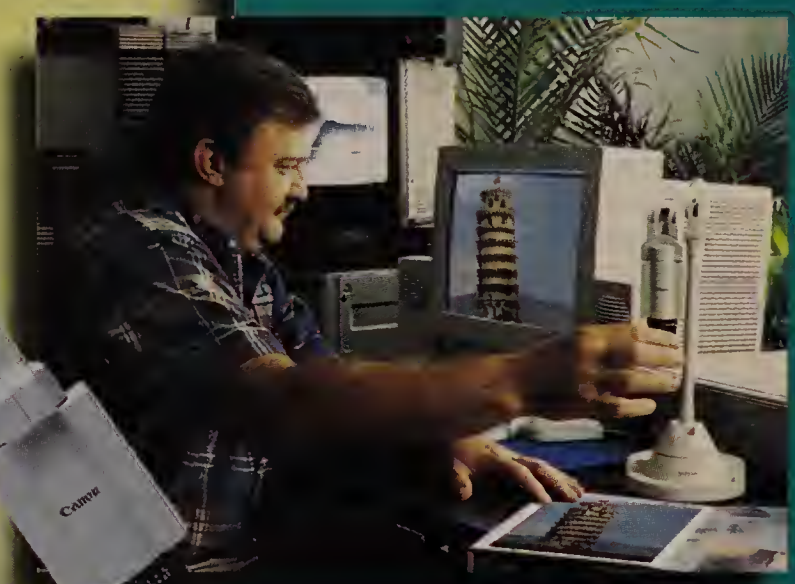
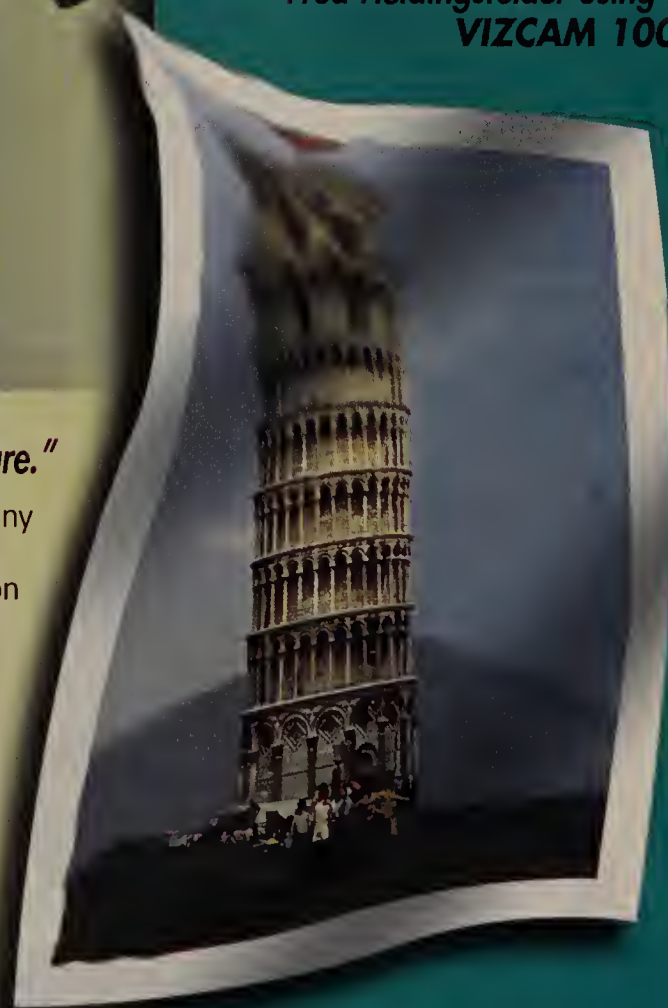
"VIZCAM imports quality images Faster ... and Reduces Production Costs."

—Fred Heidingsfelder, Fred Heidingsfelder & Associates, Pittsburgh, PA.





Fred Heidingsfelder using the ***VIZCAM 1000.***



"VIZCAM does it all: Tighter framing, Macro imaging...even 3D image capture."

Ask Fred of Fred Heidingsfelder & Associates, a video production company that creates multimedia presentations, and he'll tell you that Canon's VIZCAM is ideally suited for a wide range of multimedia, animation and video production needs where superior image quality, faster capture time, and ease-of-use are essential.

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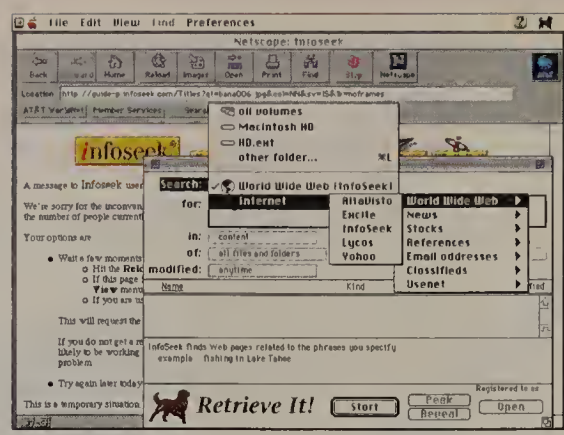
Retrieve It 2.5

SPEEDY SEARCHES OF YOUR COMPUTER AND THE WEB

THE WEB HAS TWO RELATED SEARCH problems. First, most searches—no matter how accurately formulated—return lots of useless hits. Second, your hard drive fills up with search results that themselves may need to be searched. At the moment, the best solution to both problems is Retrieve It 2.5.

Retrieve It searches files on local volumes or on LANs whether or not you're logged on to the Net, but the real payoff comes when you're connected to the Web and searching (it searches anonymously or using your E-mail address) across a variety of services. Besides offering access to the most popular Web search engines through a pop-up menu (see "Access to Everything"), Retrieve It has pop-ups for news services, E-mail addresses, Usenet newsgroups, stock-market reports, and reference works. When you find an URL in a Web document with Retrieve It, the URL is "live"; similarly, when you get an E-mail address through a Retrieve It service, you can immediately click on the address and start tapping out a message. Of course, you can do the same (albeit with several more steps) in either Netscape Navigator 3.0 or Microsoft Internet Explorer 3.0, but Retrieve It opens and connects your browser and returns just the first page of query responses. That means it takes about half as much time to search your mail and the Web—a serious consideration if your connection to the Net is via 14.4 or 28.8 Kbps.



Access to Everything Retrieve It gives you a unified, easy-to-learn approach to doing sophisticated searches across all Internet services.

Besides speed, the other strength of Retrieve It is that it will get you into the habit of formulating more-complex searches. In searching through on-disk files, you can use logical operators such as AND, NOT, OR, WITHIN, BEFORE, and AFTER to get search precision far beyond that of Apple's Fast Find utility or Microsoft Word's Find File command. Although very complex searches—such as "finance BUT NOT budget AND (travel WITHIN 15 Boston)"—can take several minutes, you have to inspect only one or two files rather than the dozens that would have resulted from a more general search. Retrieve It accesses only the five Web search services (AltaVista, Excite, Infoseek, WebCrawler, and Yahoo) that can handle its complex-search syntax gracefully; even so, some of these services experience minor glitches with BUT NOT and WITHIN constructions. On balance, though, Retrieve It lets you learn one simple syntax to improve the speed and accuracy of Web searches.

The Last Word It may seem odd to pay $65 for a utility to use with a browser you probably downloaded for free. But if you use the Internet for serious information gathering rather than simply surfing for cool sites, it will pay for itself in the first week.—CHARLES SEITER

RATING: ★★★★/7.6 **PROS:** Comprehensive approach to information management; very quick at most typical search types. **CONS:** Some search services can't handle Retrieve It's complex searches. **COMPANY:** MVP Solutions (415/562-3457, *http://www.mvpsolutions.com*). **LIST PRICE:** $65.

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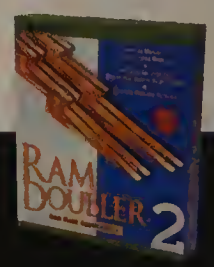

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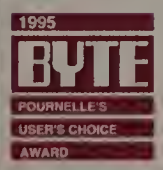

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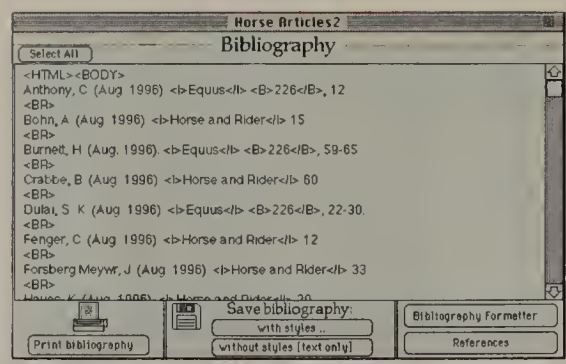
Bookends Web 3.2

ATTACH REFERENCE INFORMATION TO WEB DOCUMENTS

EVERY NOW AND THEN YOU READ about some obsessive soul saving 30 years' worth of newspapers, with a house full of stacks that reach the ceiling. Sort of sounds like the World Wide Web. Happily, Web-based publishers can now bring some order to the Web's chaos by attaching bibliographies or other reference material to their publications. Bookends Web is an enhanced version of Bookends Pro, a bibliography-management system you can use to create searchable databases of references (see *Reviews*, March 1995). Bookends Web offers all the functionality of Bookends Pro, plus the ability to easily convert references to HTML format for Web publishing.

To use Bookends Web you need an Internet connection, a Web browser, and a program that lets your Mac function as a Web server. Anyone with a Web browser can access the information in your Bookends database via your Web page.

At its most basic level, Bookends Web offers the convenience of converting bibliographies, footnotes, and other reference materials into HTML format at the click of a button. Since you can easily create and customize reference formats in Bookends, this feature saves you the trouble of tediously adding HTML formatting codes.



For Future Reference Bookends Web automatically converts bibliographies to HTML format. If you change a reference style in Bookends, you can quickly regenerate the HTML code.

Bookends Web offers more-sophisticated Web-publishing capabilities as well. For example, you can create a form that lets readers search your references by author or other criteria. You can modify the program's sample search form to fit your needs.

You can also place hypertext links in your Web page that retrieve information from Bookends Web. For instance, your page might include a link that refers to a particular article in your database. When a reader clicks on the link, Bookends Web returns bibliographic information about the article. By adding other HTML instructions, you can have Bookends Web return information, such as an article's abstract, notes, or even images. And if a document in your reference list is published on the Web, you can link to it. Although creating such links requires some knowledge of HTML, Bookends Web's tutorials are informative enough for even HTML amateurs.

It takes some time to learn the program, but the manual and tutorials are detailed and clearly written. (Although generally good, the manual contains some minor errors, and some of the instructions on setting up links need more detail.)

The Last Word On the whole, I found Bookends Web useful, flexible, and well designed. If you're a prolific publisher and run a Mac-based Web server, this program will help you do your bit to make the Web more like a library and less like the world's biggest stack of newspapers.—ERFERT FENTON

RATING: ★★★★/7.7 **PROS:** Flexible, customizable; versatile search options; automates HTML formatting. **CONS:** Manual has a few errors. **COMPANY:** Westing Software (415/945-3870, *http://www.westinginc.com*). **LIST PRICE:** $179.

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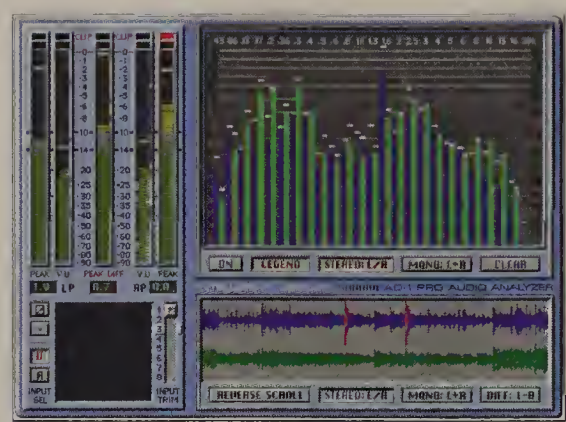
MW 100 MacWEEK

AD-1 Pro Audio Analyzer 2.0

AUDIO METERS FOR THE DISCRIMINATING PRODUCER

WHETHER YOU'RE PRODUCING interviews for an audio-enhanced Web site, sound effects for a CD-ROM, or jazz tracks for a music CD, recording at the highest possible amplitude ensures that as many digital samples as possible describe your sound. But signals over the amplitude limit produce distortion that wouldn't even appeal to fans of Nine Inch Nails. Intelligent Devices' AD-1 Pro Audio Analyzer lets you find the thin line between loud and distorted, giving you real-time meters that show within 0.1 decibel how far your audio tracks lie above or below the acceptable maximum.

While many software audio tools include simple level meters, Pro Audio Analyzer finds *clipped*, or distorted, passages that the meters on my digital-audiotape deck and Macromedia's SoundEdit 16 don't display but that are noticeable during playback. The program shows precisely how much you can turn up the volume before you'll distort your signal. A peak-hold feature marks the highest amplitude a track reaches during a user-set time and colors distorted passages red. You can set the sensitivity of the red-light clip point to between –1 and –0.05 decibels. You can also display some or all of the meters at once and listen to one channel, two channels, or the difference between two channels.



Redlining The red marks show that this passage of music needs to be turned down to avoid distortion.

Available as a plug-in for TDM (time-division multiplexing)–compatible systems or as a stand-alone application for any Digidesign audio card or Power Mac, Pro Audio Analyzer has digital level meters; a 25-band, ⅓-octave spectrum analyzer; a phase scope; and a scrolling waveform monitor. The program requires 2.5MB of RAM and a Power Mac or 680X0 Mac with a Digidesign audio card. My 7100/80 with Audiomedia II easily plays eight tracks of digital audio while monitoring left and right output channels with all four displays running.

Audio pros will recognize the straightforward interface; newcomers will benefit from the manual, which clearly explains how and why you should use each display. When I ran into trouble, Intelligent Devices' technical support quickly and patiently led me to solutions. My one complaint is that the program uses a drive-authorization copy-protection scheme.

The Last Word You can produce good digital audio without this software. But Pro Audio Analyzer's extreme accuracy, handy peak-hold feature, and clear overload marking let you maximize dynamic range and avoid clipping. If you're serious about sound and don't have accurate hardware meters, Pro Audio Analyzer is worth the price. There's nothing else like it.—JIM FEELEY

RATING: ★★★★/8.2 **PROS:** Extremely accurate audio metering; clearly marks every clipped sample. **CONS:** Copy protected. **COMPANY:** Intelligent Devices (410/744-3044). **LIST PRICE:** Stand-alone version $349; TDM version $449.

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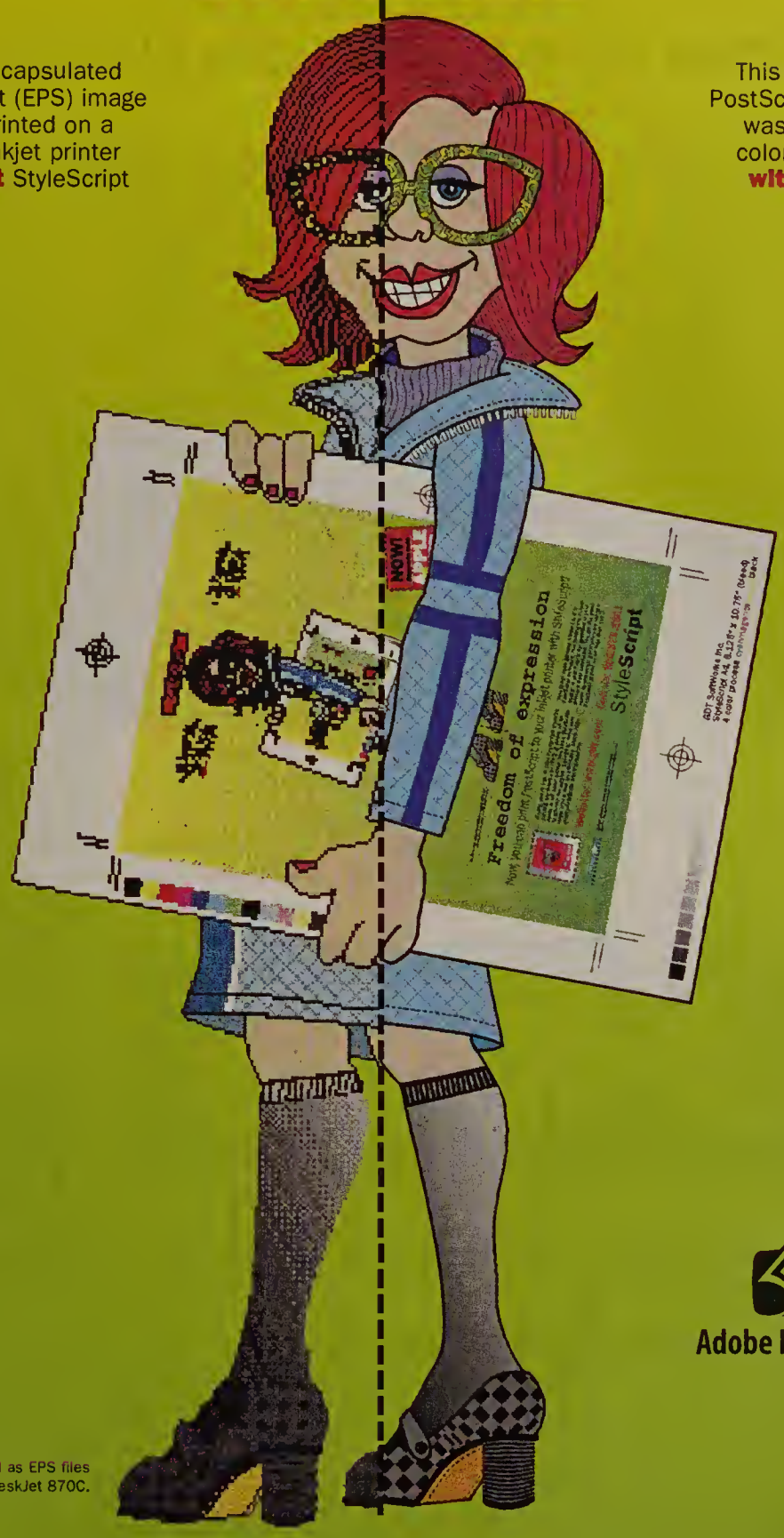

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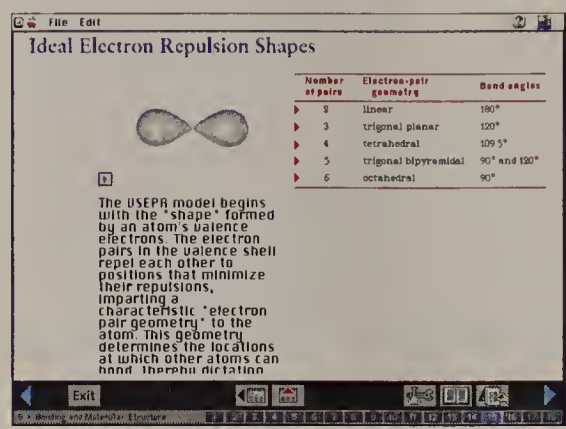
Saunders Interactive General Chemistry CD-ROM 2.1

FIRST-YEAR CHEMISTRY FOR THE MTV GENERATION

COLLEGE-LEVEL CHEMISTRY EDUCATION is based on a short list of best-selling textbooks. But the time seems ripe for a new computer-based product to revolutionize chemical education. The Saunders Interactive General Chemistry CD-ROM is *almost* that product.

For understanding the actual dynamics of a reaction, a well-designed animated simulation of molecular reality is certainly superior to static textbook diagrams. The textbook at the heart of this project, John Kotz and Paul Treichel's *Chemistry and Chemical Reactivity*, third edition, has lots of modern reaction dynamics to visualize, and Archipelago Productions, the creator of this package for Saunders (a division of Harcourt Brace), has done an excellent job of plugging the more relevant types of molecular graphics into the appropriate places.

Unfortunately, the educational CD-ROM business is still in its infancy, and 500 years of experience with print have helped developers understand how to make an impact with designs on paper, rather than on monitor screens. The included traditional-style workbook, though expertly coordinated with the CD, assumes more of the actual educational responsibility than do the impressive on-screen graphics or the audio narration. Similarly, the text, in Adobe Acrobat PDF format, really acts to remind you of paper textbooks' convenience and ease of use. (PDF is a lamentably bulky format to have become the de facto industry standard.) Still, the target customer for this product is likely to be a student who has the paper textbook already.



Mac Molecules Although putting a book on screen doesn't enhance the learning experience much, this CD packs lots of extras.

The CAChe Visualizer for introductory quantum mechanics, and the richly interactive periodic table, are especially gratifying features that offer a preview of what chemistry courses will be able to do when developers aren't limited to a format that was determined before Macs or CDs were invented. For now, though, these two features are more of an educational sideline than a direct solution for passing the final.

The Last Word Chemistry is the subject typically used by universities to weed out students in particular majors, notably premed. If you don't feel like getting weeded, Saunders Interactive General Chemistry, despite room for improvement, is a good investment.—CHARLES SEITER

RATING ★★★/6.9 **PROS:** Good animation clips for chemical reaction mechanisms; great orbital and structure-visualization software from CAChe. **CONS:** Underpowered PDF version of Kotz and Treichel textbook. **COMPANY:** Saunders College Publishing (800/782-4479, *http://www.saunderscollege.com*). **LIST PRICE:** $49.95.

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Mark Hall
Editor in Chief
Macweek
July 24, 1995

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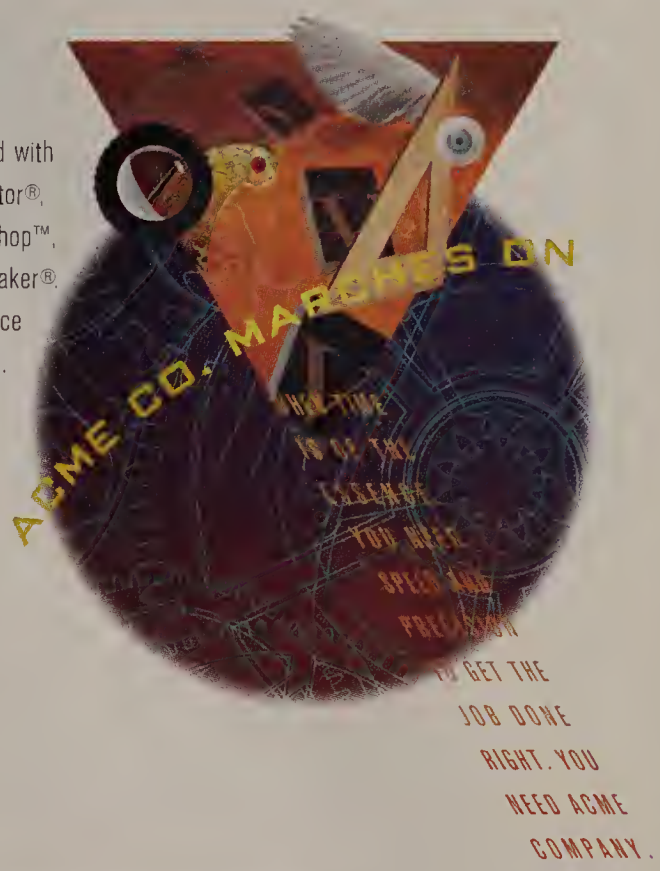

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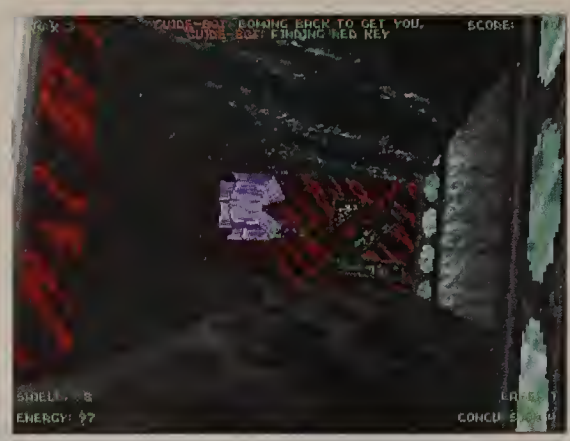
Descent II

REAL ENOUGH TO MAKE YOU QUEASY

THE SCENARIO IN DESCENT II IS familiar: aliens have taken control of robots in galactic mining facilities, using them against their erstwhile masters. Armed with a spectacular array of weaponry, you pilot your vessel through each mine, bent on destroying the reactor core that powers the robots, trying to escape the resulting blast before you're reduced to your component atoms.

As was the case with its predecessor, Descent II's most outstanding feature is also arguably its weakest point: you've got a full 360 degrees of motion in a null gravity environment, but since you're not limited to crawling along the floor, you'll often have trouble deciding which way is up. If you have a weak stomach, your thrills may be dampened by the desire to vomit.

To give MacPlay—and the game's designer, Parallax—credit, several mechanisms help you deal with being totally lost, including a 3-D map you can zoom in or out and rotate 360 degrees to match your own orientation. Another indispensable innovation is a puppylike robot, the Guide-Bot, who saves your skin—helping you find keys, locate your final target, and escape the mines without being turned into radioactive slag—while his larger kin are busily trying to remove your rivets.



Vertigo The trusty Guide-Bot will show you the way, even when you can't tell which end is up.

Descent II's network options offer lots of variety and make a fun game even more appealing. Depending on your network configuration, three to eight players can play against one another, but the real draw of network play is the number of game styles available, from the standard kill-your-friends Anarchy scenario, to Capture the Flag team games.

Descent II's graphics quality varies a bit. Most of your opponents are extremely detailed and well rendered, but some smaller targets look more like origami. Once the game picks up, you'll be too busy killing things to pass aesthetic judgment.

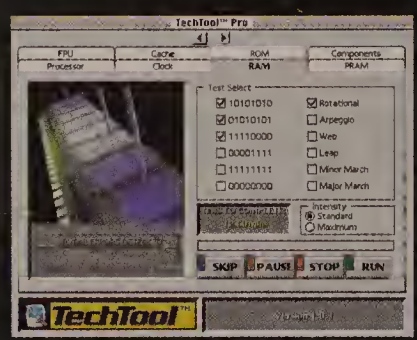
You're armed with more than 20 weapons, starting with an upgradable laser. Later toys include a variety of cannons—including one strong enough to knock your ship backward—and a range of missiles. The sheer variety of armament allows for a delightful medley of destruction.

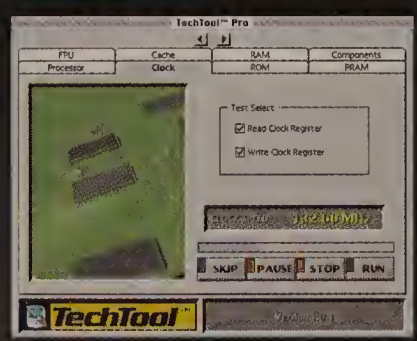
The final jewel in Descent II's crown is its intense soundtrack, performed by musicians from the industrial/alternative bands Skinny Puppy and Negative. The occasionally haunting, always powerful background grind is an exceptional counterpoint to Descent II's action.

The Last Word Descent II is an innovative 3-D shooter, combining exciting game play with killer music in a unique environment. The game's designers have added plenty of cool new twists on the old theme. If you have the stomach for it, Descent II is a must-have.—DANIEL MADAR

RATING: ★★★★/7.7 **PROS:** Exciting action; great soundtrack; unique game play; some of the biggest weapons around. **CONS:** Can cause motion sickness and disorientation; graphics could be better. **COMPANY:** MacPlay (800/462-2752, *http://www.macplay.com*). **LIST PRICE:** $59.95.

TechTool Pro™





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MICROMAT COMPUTER SYSTEMS

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Reviews, July 1995

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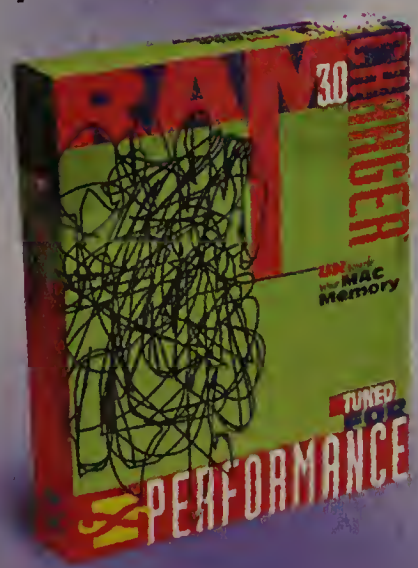

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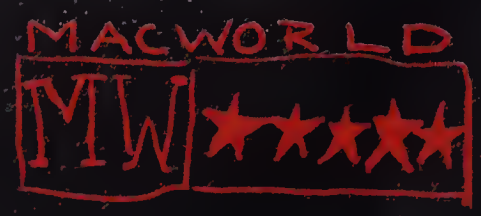

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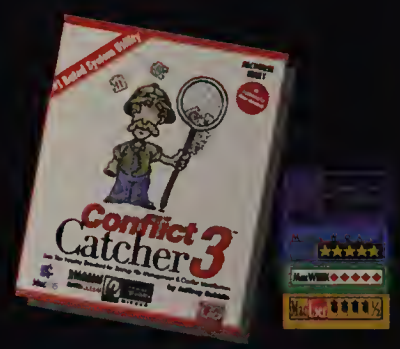

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Star Ratings

HARDWARE AND SOFTWARE PRODUCTS AT A GLANCE

Macworld Star Ratings lets you compare Macintosh products based on the authoritative assessments in our reviews and features. The number of stars indicates the product's level of quality; each product also gets a numeric score that provides a more exact assessment of the product's quality within that level. We evaluate seven factors to derive the Star Rating: feature set, design implementation, performance, reliability, ease of use, innovation, and value. We take these evaluations, weight their importance for each class of product, and calculate the final score. The higher the score, the better a product is, even among products with the same number of stars. The following list shows how the ratings and scores relate.

★★★★★	9.0 to 10.0	Outstanding
★★★★	7.0 to 8.9	Very Good
★★★	5.0 to 6.9	Good
★★	3.0 to 4.9	Flawed
★	0.0 to 2.9	Unacceptable

This section also lists products that have been awarded an **Editors' Choice** designation in a *Macworld* product comparison.

If a product has been upgraded since our last assessment, the most recent version number appears in parentheses after the main reviewed version number. To read a full review of any product in the listing, please consult the issue indicated at the end of the listing or search for the product via Macworld Online (keyword *Macworld* on America Online; URL *http://www.macworld.com* on the World Wide Web).

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

Software

BUSINESS

★★★★/8.8 **4th Dimension 3.5,** ACI US, 408/252-4444, $895. Leading Mac database gets important improvements. *Mar 96, p. 60*

★★★/6.5 **Butler SQL 2.0.2,** EveryWare Development, 905/819-1173, $695. This SQL database is well suited for serving data over the Internet. *Oct 96, p. 104*

★★★★★/9.5 **DeltaGraph 4.0,** DeltaPoint, 408/648-4000, $195. Top Mac graphing application still excels. *Sep 96, p. 90*

★★★★/7.0 **GeoQuery 5.0,** GeoQuery, 708/357-0535, $295. Put your business data on the map. *Sep 96, p. 92*

★★★★/7.8 **Let's Keep It Simple Spreadsheet 1.0,** Casady & Greene, 408/484-9228, $189.95. New approach to spreadsheets uses graphical programming style. *Sep 96, p. 67*

★★★/6.3 **Map Factory,** ThinkSpace, 519/858-5047, $996. Unique raster-based mapping program. *Nov 96, p. 70*

★★★★/7.1 **Microsoft Excel 5.0,** Microsoft, 206/882-8080, $295 (estimated). Although it's the only game in town, Excel 5 is a glutton for RAM and disk space. *Jun 96, p. 98*

★★★/6.7 **Microsoft Word 5.1,** Microsoft, 206/882-8080, $320 (estimated). Fast, sleek, stable, and probably the most widely used Mac word processor on earth. *Jun 96, p. 98*

★★★/5.1 **Microsoft Word 6.0.1,** Microsoft, 206/882-8080, $295 (estimated). The most bloated word processor on earth may be mandatory in big corporations. *Jun 96, p. 98*

★★★★/7.7 **QuickBooks Pro 4.0,** Intuit, 415/944-6000, $189. Can be customized for your business; Business Library and some Windows features not included. *Jun 96, p. 55*

★★/4.2 **SoftWindows 3.0,** Insignia Solutions, 408/327-6000, $379. Slow, but useful for those places where Windows 3.1 still rules. *Sep 96, p. 58*

★★/4.3 **SoftWindows 95 1.0,** Insignia Solutions, 408/327-6000, $379. Poky emulation is fine for limited usage, but if you use PC software regularly, consider a hardware solution. *Sep 96, p. 58*

★★★★/7.4 **WordPerfect 3.5,** Corel, 613/728-8200, $129 (estimated). In speed, interface efficiency, and Macintosh integration, WordPerfect beats all competitors. *Jun 96, p. 98*

★★/4.0 **WorldWrite 3.0,** WorldSoft, 801/350-9490, $149. New word processor is promising but nothing to write home about. *Aug 96, p. 73*

GRAPHICS

★★/4.9 **3D World 1.0,** Microspot USA, 408/253-2000, $139. Affordable but limited QuickDraw 3D design tool. *Jul 96, p. 74*

★★★★/7.1 **Adobe Illustrator 6.0,** Adobe Systems, 415/961-4400, $595. This minor upgrade isn't enough to surpass FreeHand 5.5. *Apr 96, p. 54*

★★★★/8.5 **Adobe Photoshop 3.0.5,** Adobe Systems, 415/961-4400, $895. Still the most significant and capable image editor, but its imperfections and omissions can leave you searching for alternatives. *Jun 96, p. 78*

★★★★/7.9 **The Black Box 2.0,** Alien Skin Software, 919/832-4124, $119. Straightforward Photoshop filters for creating drop shadows, bevels, and glass refraction effects. *Sep 96, p. 120*

★★★★/7.7 **Bryce 2,** MetaTools, 805/566-6200, $299. Create awe-inspiring, photorealistic 3-D landscapes. *Aug 96, p. 59*

★★★★/7.5 **Dabbler 2,** Fractal Design, 408/688-5300, $69. Drawing package offers an easy, affordable natural painting option. *Mar 96, p. 63*

★★★★/7.8 **ElectricImage Broadcast 1.0,** Electric Image, 818/577-1627, $2495. 3-D animation tool gets new price, new features. *Nov 96, p. 88*

★★/4.7 **Fastedit/Deluxe,** Total Integration, 847/776-2377, $249. Photoshop plug-in lets you edit quickly, but is expensive. *Nov 96, p. 92*

★★★★/7.5 **Form-Z RenderZone 2.8,** Autodessys, 614/488-9777, $1995. Impressive 3-D modeler gets rendering know-how. *Oct 96, p. 75*

★★★/6.5 **Gallery Effects 1.0,** Adobe Systems, 415/961-4400, $99. Useful edge-enhancement and texture Photoshop filters priced to sell. *Sep 96, p. 120*

★★★★ **Infini-D 3.0,** Specular International, 413/253-3100, $899. 3-D software does professional-quality rendering and animation. *Jan 96, p. 54*

★★★★/7.4 **Intellihance 2.0.1,** Extensis, 503/274-2020, $99.95. Photoshop plug-in automates the process of improving scanned images. *Sep 96, p. 120*

★★★★/8.3 **Kai's Power Tools 3.0.2,** MetaTools, 805/566-6200, $199. Excellent Photoshop gradient and distortion filters with a fanciful, sometimes bizarre interface. *Sep 96, p. 120*

★★★★/7.5 **KPT Convolver 1.0,** MetaTools, 805/566-6200, $199. Provides an infinite range of focus, edge-detection, and color-embossing Photoshop effects. *Sep 96, p. 120*

★★★/6.9 **KPT Cool Effects 1.0,** MetaTools, 805/566-6200, $29. "Kai's Power Tools Lite" at a bargain price. *Aug 96, p. 88*

★★★★/7.4 **Kwick Mask, Create B/W, and Rotate Color 1.0,** Hugh Kawahara, *http://www.stanford.edu/~*, freeware. These Photoshop filters preview effects directly inside the image window. *Sep 96, p. 120*

★★★★/7.2 **Live Picture 2.5,** Live Picture, 408/464-4200, $995. Live Picture stills lacks support for the blend modes and numerical focus controls and can only edit the topmost visible layer, but is superfast. *Jun 96, p. 78*

★★★/6.9 **Lumpy Noise 1.0,** Paul Badger, *pbadger@cgrg.ohio-state*, freeware. Free Photoshop plug-in applies a coating of thick, chunky noise. *Sep 96, p. 120*

★★★★/8.1 **Macromedia FreeHand 5.5,** Macromedia, 415/252-2000, $595. Draw program outperforms competitor, for now. *Feb 96, p. 74*

★★★★/7.7 **Paint Alchemy 2.0,** Xaos Tools, 415/487-

continues

Star Ratings

7000, $199. Photoshop filter applies brushstrokes to create impressionistic effects. *Sep 96, p. 120*

★★★★/8.9 **Painter 4.0,** Fractal Design, 408/688-5300, $549. Most artists should own Painter 4.0; its painting and special-effects capabilities simply can't be beat. *Jun 96, p. 78*

★★★/6.5 **PhotoLab 1.2,** Cytopia Software, 415/364-4594, $99.95. Color-correction filters that take up where Photoshop's built-in capabilities leave off. *Sep 96, p. 120*

★★★★/7.7 **PhotoMatic 2.0.1,** DayStar Digital, 770/967-2077, freeware. Photoshop filter adds batch processing and AppleScript support. *Sep 96, p. 120*

★★★/6.9 **PhotoNavigator 1.0,** Extensis, 503/274-2020, freeware. This Photoshop filter provides a thumbnail view of an image for quick and easy scrolling. *Sep 96, p. 120*

★★★/6.2 **PlateMaker 1.0.2,** A Lowly Apprentice Productions, 619/438-5790, $295. This Photoshop filter exports CMYK with spot-color channels to DCS 2.0 format. *Sep 96, p. 120*

★★★/5.1 **PowerShop,** Adaptive Solutions, 503/690-1236, $2000 (estimated). Worth considering if its few accelerated tasks are among those you perform regularly. *Jun 96, p. 87*

★★★/6.9 **Ray Dream Studio 1.0,** Ray Dream, 415/960-0765, $499. These 3-D design tools are competent and affordable. *May 96, p. 58*

★★★★/7.0 **Sculpt 3D 4.1,** Byte by Byte, 512/305-0360, $495. High-end 3-D for the mainstream. *Sep 96, p. 81*

★★★★/8.2 **Series 2, 3-D Filter 2.11,** Andromeda Software, 805/379-4105, $129. Photoshop filter projects images onto three-dimensional cubes, spheres, and cylinders. *Sep 96, p. 120*

★★★★★/9.2 **Series 3, Screens Filter 1.4,** Andromeda Software, 805/379-4109, $159. Converts a Photoshop image into alternative halftone patterns from mezzotints to wavy lines. *Sep 96, p. 120*

★★★★/8.1 **Slicer 1.0,** Fortner Research, 703/478-0181, $695. View 2-D slices of 3-D images. *Nov 96, p. 98*

★★★★/8.2 **Stylist 1.0,** Alien Skin Software, 919/832-4124, $199. Plug-in adds graphic and text style sheets to Illustrator. *Oct 96, p. 64*

★★★/6.6 **Sucking Fish 1.01,** Naoto Arakawa, *gca00443@nittyserve.or.jp*, freeware. Offbeat, undocumented Photoshop gradient and pattern filters with encryption as an added bonus. *Sep 96, p. 120*

★★★/6.8 **Terrazzo 1.0,** Xaos Tools, 415/487-7000, $199. Photoshop filter repeats images to create seamless, organic pattern. *Sep 96, p. 120*

★★/3.7 **Tropix 2.0.5,** Alaras, 919/544-1228, $4990. Tropix tames chaotic image files—but not always successfully. *Aug 96, p. 55*

★★★★/7.5 **TypeCaster 1.0,** Xaos Tools, 415/487-7000, $199. Adds three-dimensional text to any Photoshop image. *Sep 96, p. 120*

★★★/6.3 **xRes 2.0,** Macromedia, 415/252-2000, $799. Although improved, fast, and easy to learn, this image editor leaves room for improvement. *Jun 96, p. 78*

INTERNET/NETWORKING

★★★/5.7 **Amapi 2.11,** Yonowat, 415/788-1652, $398. 3-D modeler marred by awkward interface. *Nov 96, p. 87*

★★★★/7.0 **AppleScript 1.1,** Apple Computer, 408/996-1010, free. Standout CGI scripting tool is built into System 7.5. *Oct 96, p. 104*

★★/4.6 **Arachnid 1.6,** University of Iowa, *robert-mcburney@uiowa.edu*, free. This HTML editor helps you manage your site as a whole. *Oct 96, p. 114*

★★★/5.4 **BBEdit 4.0,** Bare Bones Software, 508/651-3561, $119. BBEdit is a useful tool for any active Webmaster. *Oct 96, p. 114*

★★★★/7.0 **BeyondPress 2.0,** Astrobyte, 303/534-6557, $595. XPress-to-HTML conversion program whisks you from XPress to the Internet. *Oct 96, p. 57*

★★★/5.5 **cc:Mail Mobile for Macintosh 2.0,** Lotus Development, 617/577-8500, $145. Speedy and straightforward choice for PC-centric environments, but lacks many features competitors offer. *Oct 96, p. 134*

★★★/6.6 **ChameleonNFS 3.6,** NetManage, 408/973-7171, $395 per user. Collection of small, fast Internet apps. *Nov 96, p. 81*

★★★★/8.6 **Claris Emailer 1.03,** Claris, 408/987-7000, $49 (estimated). The only application that dumps (almost) all of your messages in one in-box. *Oct 96, p. 134.* **Editors' Choice** for best E-mail over the Internet.

★★★/6.8 **COPSTalk 2.0 for Windows 95,** CoOperative Printing Solutions, 770/840-0810, $159. Cross-platform networking for PC users who need access to Mac servers. *Nov 96, p. 68*

★★★/6.9 **Cyberdog 1.0,** Apple Computer, 408/996-1010, free. Internet tools are an interesting but incomplete showcase for OpenDoc technology. *Sep 96, p. 56*

★★★★/8.0 **CyberGauge,** Neon Software, 510/283-9771, $139. Network monitoring for the masses. *Nov 96, p. 83*

★★★★/8.1 **Electronic Commerce Suite 2.0,** iCAT, 206/623-0977, $4995. Electronic Commerce Suite builds complex yet robust Web sites quickly and easily. *Oct 96, p. 104.* **Editors' Choice** for best software for building dynamic Web sites.

★★★/6.1 **Eudora Pro 3.0,** Qualcomm, 619/658-1200, $89. Internet E-mail reader improves, but not by much. *Nov 96, p. 77*

★★★★/7.8 **Excel Internet Assistant 1.0,** Microsoft, 206/882-8080, free. Excel Internet Assistant converts existing Excel files to HTML. *Oct 96, p. 114*

★★★★/8.1 **FirstClass 3.11,** SoftArc, 905/415-7000, 5 users, $495; 10 users, $695; 25 users, $1495. Offers robust E-mail, conferencing, and other features, yet easy to use. *Oct 96, p. 134.* **Editors' Choice** for best company-wide E-mail.

★★★/5.3 **Front Office 1.5,** STF Technologies, 213/259-1710, $299. Being able to retrieve a call that's gone to voice mail is great, but easier setup is necessary. *Nov 96, p. 132*

★★★/6.7 **GlobalTransfer 1.0,** Global Village, 408/523-1000, $29.95. Transferring files the easy way. *Oct 96, p. 82*

★★★/6.1 **GNNPress 1.1,** PrimeHost, 800/879-6882, $199/month for commercial site. GNNPress combines a powerful HTML editor with a site-management tool. *Oct 96, p. 114*

★★★/5.6 **HexWeb XT 2.0,** HexMac International, 415/864-7592, $349. XPress-to-HTML conversion program whisks you from XPress to the Internet. *Oct 96, p. 57*

★/2.9 **HoTMetaL Pro 2.0,** SoftQuad, 416/239-4801, $159. This Web editor just doesn't cut the mustard. *Oct 96, p. 114*

★★/3.8 **HTML Author 1.0,** Adobe Systems, 415/961-4400, included with PageMaker 6.0. This plug-in converts Adobe PageMaker files to HTML. *Oct 96, p. 114*

★★★★/7.9 **HTML Editor 1.1.4,** Rick Giles, *rick.giles@acadiau.ca*, $25. This text editor is a great all-around HTML coding aid. *Oct 96, p. 114.* **Editors' Choice** for best Web authoring tools.

★★★/6.8 **HVS Color 1.2,** Digital Frontiers, 847/328-0880, $99. Keep Web graphics small, colors true. *Oct 96, p. 72*

★★★★/8.1 **Internet Phone,** VocalTec, 201/768-9400, $50. Easy to set up once you have MacTCP—and best of all, no toll charges. *Nov 96, p. 132.* **Editors' Choice** for best telephony.

★★★/6.5 **LAN Commander,** Power On Software, 612/879-9190, $299.95 five-station pack. Network management made simple. *Oct 96, p. 79*

★★★/6.2 **MacHTPL 2.2.2,** Tim Endres, *time@ice.com*, free. This preprocessor can help you tailor your HTML for specific browsers *Oct 96, p. 104*

★★★/6.3 **MacPerl 5.0.6,** Matthias Neeracher, *neeri@iis.ee.ethz.ch*, free. This CGI scripting language is portable to other platforms. *Oct 96, p. 104*

★★★★/7.0 **MegaPhone 1.02,** Cypress Research, 408/486-7900, $100. Great for automated dialing, but limited phonebook capability is disappointing *Nov 96, p. 132*

★★★/5.6 **NetCloak 2.0.1,** Maxum Development, 708/830-1113, $195. This preprocessor adds 30 commands to those you normally use in HTML documents. *Oct 96, p. 104*

★★★/6.5 **NetForms 2.0,** Maxum Development, 708/830-1113, $195. This forms-processing aid is simple to install and use. *Oct 96, p. 104*

★★★★/7.4 **Netscape Navigator 3.0,** Netscape Communications, 415/937-2555, $49. Still the best browser, but could use a diet. *Nov 96, p. 62*

★★★/6.7 **PageMill 1.02,** Adobe Systems, 415/961-4400, $149. This WYSIWYG HTML editor does its job with reliability and flair. *Oct 96, p. 114*

★★★★/7.5 **PC MacLAN 6.0 for Windows 95,** Miramar Systems, 805/966-2432, $199. The choice for peer-to-peer cross-platform networking. *Nov 96, p. 68*

★★★/6.3 **QuickMail 3.6,** CE Software, 515/221-1801, single user $199; 10 users $649; 25 users $1449. Easy to use, but message-tracking features are limited. *Oct 96, p. 134*

★★★/6.3 **SiteMill 1.0.3,** Adobe Systems, 415/961-4400, $595. SiteMill is a powerful management tool for your Web site. *Oct 96, p. 114*

★★/4.8 **SuperVoice 2.0,** Pacific Image Communications, 818/457-8880, $130. Hampered by bugs, glitches, and inability to import phone numbers. *Nov 96, p. 132*

★★★/6.7 **SupraSonic VoiceMail,** Diamond Multimedia, 360/604-1400, $289. Still looks like fax software with voice capability added on, but it's got potential. *Nov 96, p. 132*

★★★/6.6 **Tango 1.5,** EveryWare Development, 905/819-1173, $495. This CGI program forwards queries to a SQL database and reformats the responses into HTML. *Oct 96, p. 104*

★★★★/7.3 **Tango for FileMaker Pro 3.0,** EveryWare, 905/819-1173, $349. Tool kit for putting your FileMaker database on the Web. *Oct 96, p. 59*

★★★/6.7 **Tapestry 1.1,** Concept 1, 905/305-8655, $69. Beginners get help weaving the perfect Web site. *Oct 96, p. 80*

★★★/6.8 **tcpConnect4 4.0 Enterprise,** InterCon, 703/709-5500, $495 per user. Internet access suite is easy to set up, but lacks some conveniences. *Nov 96, p. 81*

★★★/5.5 **Timbuktu Pro for Networks 2.0,** Farallon Computing, 510/814-5000, $139 to $3999. Despite some drawbacks, this is the next-best thing to being there. *Oct 96, p. 134*

★★★★/7.4 **Tumbleweed Publishing Essentials 1.0,** Tumbleweed Software, 415/363-7022, $695. A faster, cheaper alternative to Acrobat. *Oct 96, p. 70*

★★★/5.5 **Voice Messenger,** Cypress Research, 408/486-7900, $149. A clean and simple interface, but easier setup is necessary. *Nov 96, p. 132*

continues

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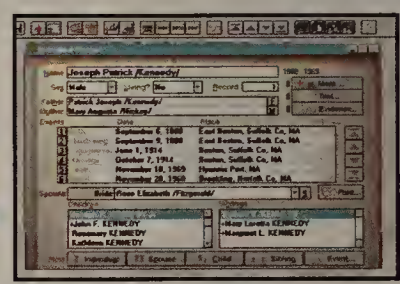

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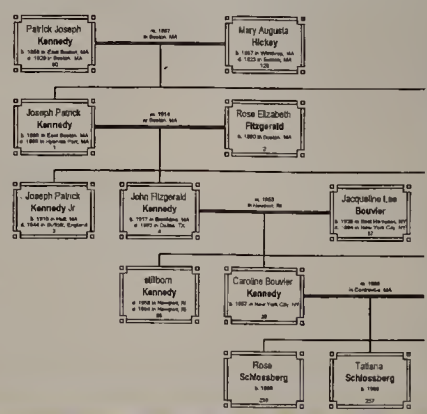

FEATURES:		FAMILY GATHERING (Macintosh)	LEADING COMPETITOR (Macintosh)
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Star Ratings

★/1.0 **WebDoor 1.2,** Open Door Networks, 541/488-4127, $20-60/month. WebDoor's authoring software is abysmal. *Oct 96, p. 114*

★★★★/7.9 **Webmaker 2.2,** Harlequin, 617/374-2400, $99. For converting FrameMaker documents to the Web, WebMaker has no equal. *Oct 96, p. 114.* **Editors' Choice** for best Web authoring tools.

★★★★/7.8 **Word Internet Assistant 1.0,** Microsoft, 206/882-8080, free. Word Internet Assistant converts existing Word files to HTML. *Oct 96, p. 114*

★★★★/8.0 **YoYo 1.2,** Big Island Communications, 408/342-8300, $149. Innovative telephony software is an amazing productivity tool. *Nov 96, p. 64*

MEDIA

★★★★/7.4 **Adobe Premiere 4.2,** Adobe Systems, 415/961-4400, $795. Video editor offers significant enhancements, including CD-ROM Movie Maker plug-in. *Mar 96, p. 90*

★★★★/7.1 **Apple Media Tool 2.0,** Apple Computer, 408/996-1010, $495. Easy for simple interactivity, but advanced features require add-on products. *Aug 96, p. 100*

★★★★/7.1 **Authorware 3.5,** Macromedia, 415/252-2000, $4995. Authorware offers great features and usability but is very costly. *Aug 96, p. 100*

★★/3.9 **Digital Box Office 1.0,** PowerProduction Software, 310/937-4411, $599. Combines object- and timeline-oriented authoring, but has an awkward user interface. *Aug 96, p. 100*

★★★★/7.5 **Digital Performer 1.71,** Mark of the Unicorn, 617/576-2760, $895. Audio program does an unparalleled job of altering pitch and tempo. *Sep 96, p. 76*

★★★★/7.2 **Director 5.0,** Macromedia, 415/252-2000, $1195. Multimedia authoring tool gets polish and a performance boost. *Jul 96, p. 52.* **Editors' Choice** for best authoring programs. *Aug 96, p. 100*

★★★★/8.3 **Final Effects AP 1.0,** MetaTools, 805/566-6200, $199. Add cool video effects to Adobe Premiere. *Aug 96, p. 86*

★★★★/7.0 **mTropolis 1.0,** mFactory, 415/548-0600, $4995. Fast and easy to implement; but limited text support, and it's expensive. *Aug 96, p. 100*

★★★/6.8 **Oracle Media Objects 1.0.5.4,** Oracle, 415/506-7000, $495. Good interface and multiplatform support, but requires too much scripting. *Aug 96, p. 100*

★★★/6.9 **Peak 1.02,** Bias, 415/331-2446, $299. Digital-audio program combines versatility and power. *Aug 96, p. 60*

★★★★/7.8 **Pro View 1.3,** E-magine, 800/603-1474, $99.95. Back-to-basics presentation tool. *Nov 96, p. 95*

★★★★/7.0 **Special Delivery 2.1,** Interactive Media, 415/948-0745, $259. Easy to use, but lacks hypertext. *Aug 96, p. 100.* **Editors' Choice** for best authoring software.

★★★★/7.2 **Studio Vision Pro 3.0.3,** Opcode Systems, 415/856-3333, $895. For MIDI-audio conversion, this audio program is the one to buy. *Sep 96, p. 76*

PRODUCTIVITY

★★★/6.8 **Claris Organizer 1.0,** Claris, 408/987-7000, $49 (estimated). This simple little PIM is fast, easy to learn, and intelligently designed. *Jun 96, p. 106*

★★★★/8.4 **ClarisWorks 4.0,** Claris, 408/727-8227, $129 (estimated). The program has speed, a clean design, and low resource requirements. *Jun 96, p. 98*

★★★/6.9 **DateBook Pro 4.2,** Now Software, 503/274-2800, $69.95 (estimated). A well-designed but often sluggish calendar and scheduling program. *Jun 96, p. 106*

★★★/5.2 **Full Contact 3.0,** Pitch Software, 408/374-5504, $199. Resurrected PIM has been improved—but not enough. *Jun 96, p. 70*

★★★★/7.0 **In Control 4.0,** Attain, 617/776-1110, $85. Outline-based PIM adds net links. *Aug 96, p. 63*

★★★/6.9 **InTouch 2.5.2,** Prairie Group, 515/225-3720, $49.95. A contact manager that doesn't force you to plug information into designated slots. *Jun 96, p. 106*

★★★/6.9 **Micro Planner Manager 1.4,** Micro Planning International, 303/757-2216, $695. Project-management application takes scheduling seriously. *Jun 96, p. 65*

★★★★/8.3 **Quicken Deluxe 6,** Intuit, 520/295-3220, $59.99. The best-selling package gets bigger and mostly better. *Feb 96, p. 65*

★★★/6.8 **TouchBase Pro 4.2,** Now Software, 503/274-2800, $69.95 (estimated). Slow, but offers up to 16 custom fields. *Jun 96, p. 106*

★★★★/7.1 **WebArranger 2.0,** CE Software, 515/221-1801, $99.95. Resurrected PIM offers strong suite of Internet tools. *Aug 96, p. 63*

PUBLISHING

★★★★/7.1 **3D Web Workshop 1.0,** Specular International, 413/253-3100, $249. Instant Internet presence in 3-D. *Oct 96, p. 68*

★★★★ **Adobe PageMaker 6.0,** Adobe Systems, 206/622-5500, $895. Page-layout program's upgrade includes practical and powerful improvements. *Nov 95, p. 60*

★★★★ **FrameMaker 5.0,** Adobe Systems, 408/975-6000, $895. Page-layout program is a good choice for technical-document creation. *Nov 95, p. 63*

★★★/6.0 **MasterJuggler Pro 2.0,** Alsoft, 713/353-4090, $89.95. MasterJuggler wants to be your favorite font manager. *Sep 96, p. 72*

★★★/6.1 **Ready,Set,Go 7.0.2,** Abbott Systems, 914/747-3116, $395. Revamped page-layout software offers more than the basics. *Sep 96, p. 83*

★★★/6.1 **Suitcase 3.0.1,** Symantec, 503/334-6054, $69.95. Suitcase vies with MasterJuggler for superiority, and still no clear winner. *Sep 96, p. 72*

★★★/5.1 **Xdream 1.0,** Vision's Edge, 904/386-4573, $149. XDream comprises 24 tools ranging from useful to indispensable. *Jun 96, p. 50*

★★★★/7.1 **XPert Tools 1.0,** XChange, 415/864-7592, $99 per volume, $169 for both. If you need to go beyond Quark's feature set, XPert Tools will take you there. *Jun 96, p. 50*

UTILITIES

★★★★/7.9 **BorderGuard Access Router,** Network Systems, 612/424-4888, $1700. Transparent encryption of AppleTalk and TCP/IP that lets you use the Internet instead of a private WAN. *Nov 96, p. 146*

★★★/5.7 **Captivate 4.5,** Mainstay, 805/484-9400, $89.95. Screen grabber fumbles but survives. *Jun 96, p. 74*

★★/3.8 **CD AutoCache 1.1,** CharisMac Engineering, 916/885-4420, $79.95. Offers nice interface, but is buggy and only minimal performance boost. *Jun 96, p. 62*

★★★/5.4 **CD-ROM ToolKit 2.0.1,** FWB Software, 415/325-4392, $79. Attractive interface, but is RAM-hungry with minimal performance boost. *continues*

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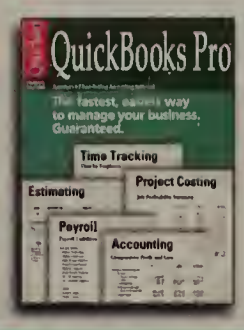

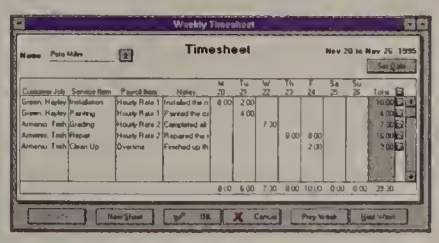

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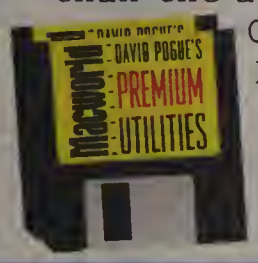

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Star Ratings

Jun 96, p. 62

★★/3.9 **Faxstf 3.2,** STF Technologies, 816/463-1412, $99 single-user version; $295 5-user/fax server. Faxing application suffers from its revision. *Oct 96, p. 66*

★★★★/8.0 **FileGuard 3.0,** ASD Software, 909/624-2594, $139. Most of the features you need, combined with ease of installation, reliable performance, and robust protection. *Nov 96, p. 146.* **Editors' Choice** for best desktop security software.

★★★/6.6 **Font Box 1.8.3,** Insider Software, 619/622-9900, $79.95 to $169.95. Font fixer could use some repairs. *Nov 96, p. 90*

★★★★/8.2 **Here & Now 2.0,** Software Architects, 206/497-0122, $75. The best choice for helping Windows 95 files work with the Macintosh. *Sep 96, p. 60*

★★★★/8.5 **HSM ToolKit 1.0,** FWB, 415/325-4392, $79. Infinite storage made infinitely more simple. *Oct 96, p. 77*

★★★★/7.8 **KeyServer 4.1,** Sassafras Software, 603/643-3351, $800. Easy-to-install tool enforces usage thresholds and lets you track applications. *Nov 96, p. 146*

★★★/5.6 **LaserMerge Electronic Paper 2.0,** MindGate Technologies, 615/937-6800, $95. Souped-up printing utility multiplies your output options. *Sep 96, p. 87*

★★★/5.9 **Mac Drive 95 1.0,** Media4, 515/225-7409, $60. Mac Drive 95 offers acceptable, if inelegant, file sharing with Windows 95. *Sep 96, p. 60*

★★★★/8.3 **Mac Manager 3.1,** ELS, 352/375-0558, $299. Provides both safe and impenetrable access protection and data encryption. *Nov 96, p. 146*

★★★/6.7 **MacOpener 2.0,** DataViz, 203/268-0030, $50. A marked improvement over the flawed original, but its reliance on DOS extensions is disappointing. *Sep 96, p. 60*

★★★/6.7 **MacTools Pro 4.0,** Symantec, 541/334-6054, $149.95. A respectable troubleshooting and data-recovery program for a reasonable price. *Jun 96, p. 106*

★★★/6.8 **MacTransfer 1.0,** Insignia Solutions, 408/327-6000, $55. For inexpensive simplicity with some limitations, MacTransfer is a solid choice for cross-platform file exchanges. *Sep 96, p. 60*

★★★★/8.1 **NetShade 1.1,** Atemi, 217/352-3689, $299. Easy to install and configure, it scrambles data and foils all but the most determined sniffers. *Nov 96, p. 146*

★★★★/8.1 **Network Security Guard 3.1,** Mr. Mac Software, 619/453-2845, $289. Scans your network for unintentional guest access, poorly chosen passwords, and other security loopholes. *Nov 96, p. 146*

★★★/6.8 **Norton Utilities 3.2,** Symantec, 541/334-6054, $149.95. An easy-to-use toolkit that works wonders on bad disks, corrupted files, and crashed hard drives. *Jun 96, p. 106*

★★★/6.4 **Now Utilities 6.0,** Now Software, 503/274-2800, $89.95. A good collection of utilities, but a mediocre upgrade. *Aug 96, p. 59*

★★★★/7.4 **QuicKeys 3.0.1,** CE Software, 515/221-1801, $119. The winner for an easy way to automate repetitive tasks using macros. *Jun 96, p. 106*

★★★/5.7 **SAM 4.0.8,** Symantec, 541/334-6054, $69. SAM finds viruses, kills 'em. *Jul 96, p. 72*

★★★★/7.3 **StuffIt Deluxe 4.0,** Aladdin Systems, 408/761-6200, $129.95. Same compression format, but faster and with a brilliant Finder twist. *Oct 96, p. 61*

★★★/6.9 **Tempo II Plus 3.0.9,** Affinity Microsystems, 303/442-4840, $179.95. Powerful macro program suffers from complexity and an awkward interface. *Jun 96, p. 106*

★★★/5.1 **TransferPro 1.0,** Digital Instrumentation Technology, 505/662-1459, $189. File-transfer capabilities need to work better in the Windows 95 world. *Sep 96, p. 60*

★★★★/7.0 **WebLock 1.0,** Maxum Development, 708/830-1113, $195. Gives your Web server access protection via password log-in to protect private pages. *Nov 96, p. 146*

★★★★/8.5 **WebStar SSL 1.2.4,** Quarterdeck, 310/309-3700, $1295. Lets you use transparent encryption to exchange sensitive data safely with security socket layer-capable Web browsers. *Nov 96, p. 146.* **Editors' Choice** for best network security.

★★/3.7 **XChange 1.2,** Optima Technologies, 714/476-0515, $49. Cross-platform transfer capabilities are a buggy, premature disappointment. *Sep 96, p. 60*

Hardware

PRINTERS

★★★/5.7 **4039 10plus,** Lexmark, 606/232-2000, $1249. Fast on text, but low Postscript emulation; high-quality output; expensive. *Sep 96, p. 181*

★★★/6.9 **Apple Color StyleWriter 1500,** Apple Computer, 408/996-1010, $289. Low-cost color ink-jet offers a bargain-priced option. *Jul 96, p. 59*

★★★★/7.5 **Apple Color StyleWriter 2500,** Apple Computer, 408/996-1010, $389. Color ink-jet has quality and speed. *Jul 96, p. 59*

★★★/6.9 **Canon BJC-4550,** Canon, 714/438-3000, $499. If you need color 11-by-17-inch output, the Canon BJC-4550 is your choice. *Nov 96, p. 60*

★★★/6.5 **Canon CLBP 360PS,** Canon USA, 516/328-5000, $12,500. Color laser printer had good text output, but other tests were mediocre. *Nov 96, p. 157*

★★★/6.7 **Color LaserWriter 12/600 PS,** Apple Computer, 408/996-1010, $6989 (estimated). Slow speed but excellent text output. *Nov 96, p. 157*

★★★★/7.2 **Digital Science 8650 PS,** Eastman Kodak, 800/235-6325, $10,795 plus $995 for Ethernet. Top performance and solid image quality highlight Kodak's newest dye-sub printer. *Oct 96, p. 60*

★★★★/7.8 **Epson Stylus Color 500,** Epson, 310/782-0700, $379. The Stylus Color 500's quality is excellent, its speed is superior, and its price is right. *Nov 96, p. 60*

★★★/5.1 **HP Color LaserJet 5M,** Hewlett-Packard, 408/246-4300, $9195. Inferior output; slow; messy consumables. *Nov 96, p. 157*

★★★★/7.2 **HP DeskWriter 680c,** Hewlett-Packard, 208/323-2551, $357. If you print lots of text, the DeskWriter 680c is a fine, reliable printer. *Nov 96, p. 60*

★★★/5.9 **HP LaserJet 5M,** Hewlett-Packard, 408/246-4300, $2229. A good workgroup printer gets better. *Jul 96, p. 56*

★★★★/7.1 **HP LaserJet 5MP,** Hewlett-Packard, 408/246-4300, $1299. Consistently quick performance and high-quality output. *Sep 96, p. 181.* **Editors' Choice** for best personal laser printers.

★★★/6.5 **HP LaserJet 5Si MX,** Hewlett-Packard, 408/246-4300, $4899. Pricey, but offers top speed and quality. *Jun 96, p. 116.* **Editors' Choice** for best workgroup printers.

★★★/5.6 **LaserWriter 4/600 PS,** Apple Computer, 408/996-1010, $929 (estimated). Slow overall performance, good text and adequate-quality graphics output. *Sep 96, p. 181*

★★★/5.8 **LaserWriter 12/640 PS,** Apple Computer, 408/996-1010, $1599 to $1829. Workgroup printer is slower—but cheaper—than HP's LaserJet 5M.

continues

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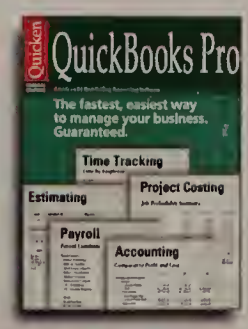

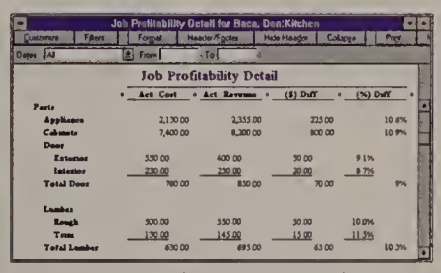

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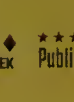

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Star Ratings

Oct 96, p. 62

★★★/6.6 **magicolor CX/32,** QMS, 334/633-4300, $7999. Unexceptional output for this color laser printer. *Nov 96, p. 157*

★★★/6.5 **microLaser Pro/8,** Texas Instruments, 800/848-3927, $1299. Speedy performance, but poor-quality graphics output. *Sep 96, p. 181*

★★/4.9 **OL610e/PS,** Okidata, 609/235-2600, $949. Middling performance; poor text and graphics output quality. *Sep 96, p. 181*

★★★/6.1 **OL810e/PS,** Okidata, 609/235-2600, $1439. 1200 by 600 dpi; quick performance; excellent text but poor graphics output. *Sep 96, p. 181*

★★★★/7.0 **Optra C,** Lexmark International, 606/232-2000, $6849. This color laser printer has easy-to-use controls; good text and graphics output. *Nov 96, p. 157*

★★/4.3 **Personal LaserWriter 300,** Apple Computer, 408/996-1010, $652 (estimated). Slow performance, grainy output, low price. *Sep 96, p. 181*

★★★★/7.9 **Phaser 350,** Tektronix, 503/682-7377, $3495. Solid-ink printer delivers laser-quality output. *Nov 96, p. 67*

★★★★/7.6 **Phaser 550,** Tektronix, 503/685-3067, $6995. Fastest color laser printer tested; superior output; true 1200-dpi resolution. *Nov 96, p. 157.* **Editors' Choice** for best color laser printers.

★★★★/7.2 **XPrint 4915 Plus,** Xerox, 716/442-4028, $4995. Top-notch graphic output; a great color laser printer value. *Nov 96, p. 157.* **Editors' Choice** for best color laser printers.

★★★/6.9 **XPrint 4925 Plus,** Xerox, 716/442-4028, $8995. Color laser printer's graphics results are among the best, but speed was unimpressive. *Nov 96, p. 157*

STORAGE

★★★★/7.6 **2.6GB Optical,** La Cie, 503/520-9000, $1999. Low price for this format, great software, and uses high-performance Sony mechanism. *Oct 96, p. 141.* **Editors' Choice** for best optical drives.

★★★/6.2 **640MB MO Optical,** La Cie, 503/520-9000, $599. Decent performance, low media cost; but no performance match for Iomega's Jaz drive. *Oct 96, p. 141*

★★/4.8 **704.2GB,** Liberty Systems, 408/983-1127, $1799. Far too costly for a just-above-average performer. *Sep 96, p. 140*

★★★/6.0 **APS 4.0,** APS, 816/483-1600, $1100. Very fast drive, decently priced. *Sep 96, p. 140*

★★★/5.0 **APS 9.0,** APS, 816/483-1600, $2200. A fast drive but power supply fan was extremely noisy. *Sep 96, p. 140*

★★★★/7.2 **APS PD4,** APS Technologies, 816/483-1600, $499.95. Excellent low-priced, small-footprint unit, bundled with APS PowerTools, PowerCD. *Oct 96, p. 141.* **Editors' Choice** for best optical drives.

★★/4.9 **Atlas QM34300,** MegaHaus, 713/534-3919, $1299. Average performer; suffers from a passive terminator. *Sep 96, p. 140*

★★/4.6 **Blue 4000,** Microtech International, 203/468-6223, $1820. Pricey, above-average performer with faulty LCD display. *Sep 96, p. 140*

★★★/5.9 **Cheetah Plus,** Plasmon Data, 408/474-0100, $2575. Minimal documentation, mediocre performance reduce this drive's appeal. *Oct 96, p. 141*

★★★★/7.4 **DC DLT 4000,** Direct Connections, 612/937-9771, $3495. Top performer among DLT drives in price, performance, warranty. *Aug 96, p. 143.* **Editors' Choice** for best tape-backup system.

★★★/6.6 **DC SDT 7000,** Direct Connections, 612/937-9771, $999. The top performer in DAT drives for performance, price, and warranty. *Aug 96, p. 143.* **Editors' Choice** for best tape-backup system.

★★★★/7.4 **DisKovery 2600MO,** Optima Technology, 714/476-0515, $2395. Reasonable price, great software, and uses a high-performance Sony mechanism. *Oct 96, p. 141*

★★★/5.9 **DisKovery 4100W,** Optima Technology, 714/476-0515, $1565. Shipped with a Mac-to-PC file-exchange utility; beware the short warranty. *Sep 96, p. 140*

★★★/6.7 **EZFlyer 230MB,** SyQuest, 510/226-4000, $299; cartridges $29.95. SyQuest's new removable drive tries (again) to outzip Iomega. *Oct 96, p. 56*

★★/4.9 **Hammer 8700FMF,** FWB, 415/474-8055, $3449. Slow, pricey drive; we expect better from FWB. *Sep 96, p. 140*

★★★/5.4 **HammerDisk 230,** FWB, 415/325-4392, $769. Overpriced; uses older, slow technology. *Oct 96, p. 141*

★★★/6.7 **Hammer PE 2000,** FWB, 415/325-4392, $1079. For the fastest performance, the Hammer PE 2000 is the choice. *Jun 96, p. 153.* **Editors' Choice** for best 1.0GB to 2.5GB hard drive.

★★★/5.5 **HDA4.0MVD-M1,** DynaTek, 902/832-3000, $999. Fast, economical, AV-ready unit; but replace the bundled software driver. *Sep 96, p. 140*

★★★/5.0 **HP SureStore Optical 2600FX,** Hewlett-Packard, 970/635-1000, $2995. Poor performance in its class, a lead brick of a case, and overpriced. *Oct 96, p. 141*

★★★★/8.3 **Jaz Drive,** Iomega, 801/778-1000, $599.95. Iomega thinks big with Zip's new sibling. *Jun 96, p. 48*

★★/4.9 **LF-7300A,** Panasonic Communications & Systems, 201/348-7000, $2995. Overpriced and slow; it can't compete with a 2.6GB MO drive. *Oct 96, p. 141*

★★★/5.4 **MC1991,** MegaHaus, 713/534-3919, $2399. Fast and reasonably priced, but its passive termination can be a headache. *Sep 96, p. 140*

★★★/5.0 **PD4207S,** ProDirect, 612/941-1805, $1050. Good value, but it's not for high-performance needs. *Sep 96, p. 140*

★★★★/7.0 **PDC 2400,** ProDirect, 612/941-1805, $800. 2.4GB drive is tops for speed, value, and design. *Jun 96, p. 153.* **Editors' Choice** for best 1.0GB to 2.5GB hard drive.

★★★/6.9 **PD/CD,** Plasmon Data, 408/474-0100, $620 (estimated). This dual-purpose drive is worth considering if you need a CD-ROM drive. *Oct 96, p. 141*

★★★/5.2 **PD/CD-ROM,** Panasonic Communications & Systems, 201/348-7000, $649.95. Nonstandard connectors, DIP SCSI ID settings, and poor documentation bring this drive down. *Oct 96, p. 141*

★★/4.8 **PDST9000W,** ProDirect, 612/941-1805, $2085. Eminently affordable, but sluggish performance. *Sep 96, p. 140*

★★★/6.4 **Phasewriter Dual PD,** Toray Marketing & Sales, 415/341-7152, $649 (estimated). Neither price nor performance can keep pace with the competition's. *Oct 96, p. 141*

★★★/5.2 **Platinum PL4.0G,** CMS Enhancements, 714/517-0915, $1499. Active termination, but won't serve high-performance needs. *Sep 96, p. 140*

★★/4.6 **Platinum PL4.0G-W,** CMS Enhancements, 714/517-0915, $1550. A little pricey for average performance. *Sep 96, p. 140*

★★★/5.2 **PocketHammer 4100FMF-W,** FWB, 415/474-8055, $2569. Too steep a price for a just-above-average performer. *Sep 96, p. 140*

★★★/6.8 **PowerMO 2600,** Olympus Image Systems,

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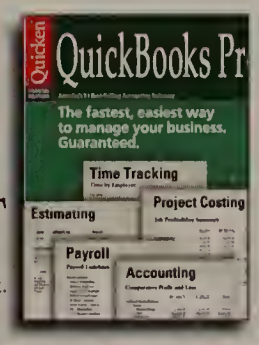

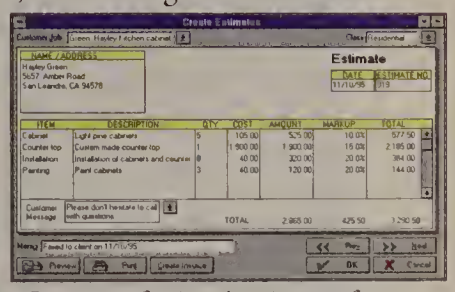

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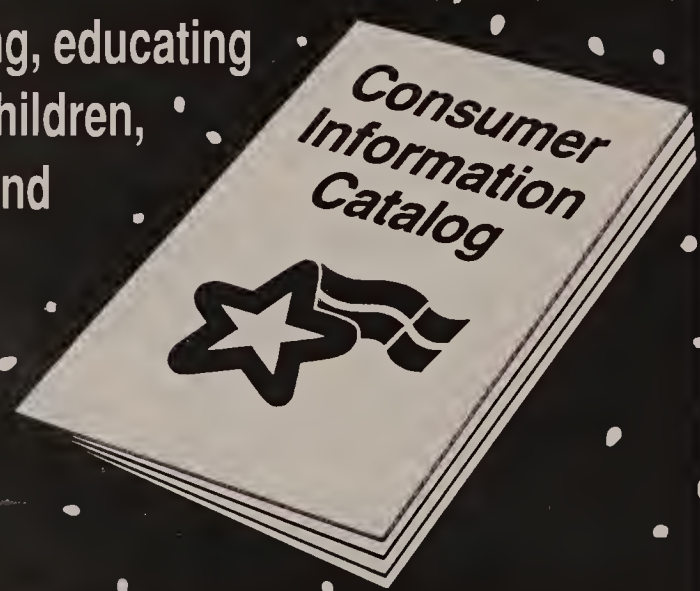

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Star Ratings

516/844-5000, $2199 (estimated). Reasonable price and a two-year warranty, but middle-of-the-pack performance. *Oct 96, p. 141*

★★★/5.5 **PR2.4207WP,** ProMax, 714/727-3977, $1995. Case with extra bay offers good value with an additional drive. *Sep 96, p. 140*

★★★/5.1 **Quantum Atlas,** La Cie, 503/520-9000, $969. An average performer for an average price. *Sep 96, p. 140*

★★★/5.4 **SB-8640,** MicroNet, 714/453-6000, $3380. A top performer, but why only a three-year warranty? *Sep 96, p. 140*

★★★/5.3 **SSW-4100,** MicroNet, 714/453-6045, $2320. Solid, rugged packaging but only average performance. *Sep 96, p. 140*

★★★/5.8 **T4-2600,** Maxoptix, 510/353-9700, $2425. No formatting software included and slow performance in its class. *Oct 96, p. 141*

SYSTEMS

★★★★/8.1 **Apple Network Server 700,** Apple Computer, 408/996-1010, $12,500. Stunningly fast and brutally robust tower system. *Sep 96, p. 75*

★★★/5.5 **OrangePC 440,** Orange Micro, 714/779-2772, $1347. Fast performance knocks out SoftWindows. *Sep 96, p. 58*

★★★★/7.0 **Performa 6400/200,** Apple Computer, 408/996-1010, $2799. A delightful SOHO system, but a bit pricey. *Nov 96, p. 63*

★★★/5.9 **PowerBook Duo 2300c,** Apple Computer, 408/996-1010, $3699 (8MB of RAM, 750MB hard drive); $4699 (20MB of RAM, 1.1GB hard drive, 14.4-Kbps fax modem). This new Duo packs a lot of power into a little package. *Apr 96, p. 58*

★★★★/7.3 **PowerCenter 150,** Power Computing, 512/388-6886, $2995. Until Apple puts more muscle in the 7500, this is the best desktop choice—and it's fairly inexpensive to boot. *Jul 96, p. 84.* **Editors' Choice** for best business user's system.

★★/4.6 **Power Macintosh 7200/120,** Apple Computer, 408/996-1010, $2299. Apple should discontinue this line. It's not that cheap, and to upgrade to a 7600 will cost another $2000. *Jul 96, p. 84*

★★/4.3 **Power Mac 7200/120 PC Compatible,** Apple Computer, 408/996-1010, $2799. Cards come on strong; SoftWindows is still slow. *Sep 96, p. 58*

★★★/6.0 **Power Macintosh 8500/150,** Apple Computer, 408/996-1010, $4699. The 8500 is for AV professionals, despite its hard-to-upgrade design and high price. *Jul 96, p. 84*

★★★★/7.1 **PowerTower 166,** Power Computing, 512/388-6886, $3795. Comparable in performance to a Power Mac 8500/150, the PowerTower 166 is cheaper but lacks AV features. *Jul 96, p. 84*

★★★★/7.6 **PowerTower Pro 180,** Power Computing, 512/388-6868, $4195 (16MB RAM, 2GB hard drive, 512K cache, 4MB VRAM). Top performance at a solid price. *Oct 96, p. 63*

★★★★/7.7 **PowerTower Pro 200,** Power Computing, 512/388-6868, $4495 (16MB RAM, 2GB hard drive, 512K cache, 4MB VRAM). Middle of the PowerTower Pro line. *Oct 96, p. 63*

★★★★/7.9 **PowerTower Pro 225,** Power Computing, 512/388-6868, $4995 (16MB RAM, 2GB hard drive, 512K cache, 4MB VRAM). Power Computing offers the fastest desktop PC ever. *Oct 96, p. 63*

★★★/6.8 **SuperMac S900L 640/150,** Umax Computer, 510/226-6886, $3995 (16MB of RAM, 2GB hard drive, 512K cache, 4MB VRAM). SuperMac speeds past Apple. *Oct 96, p. 63* m

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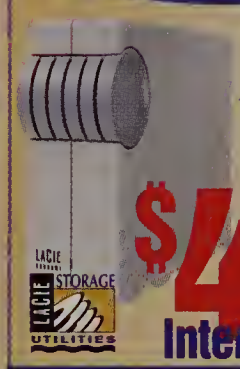

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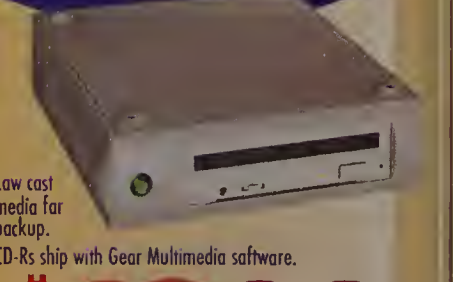

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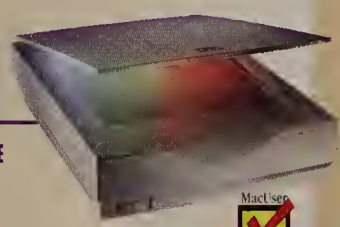

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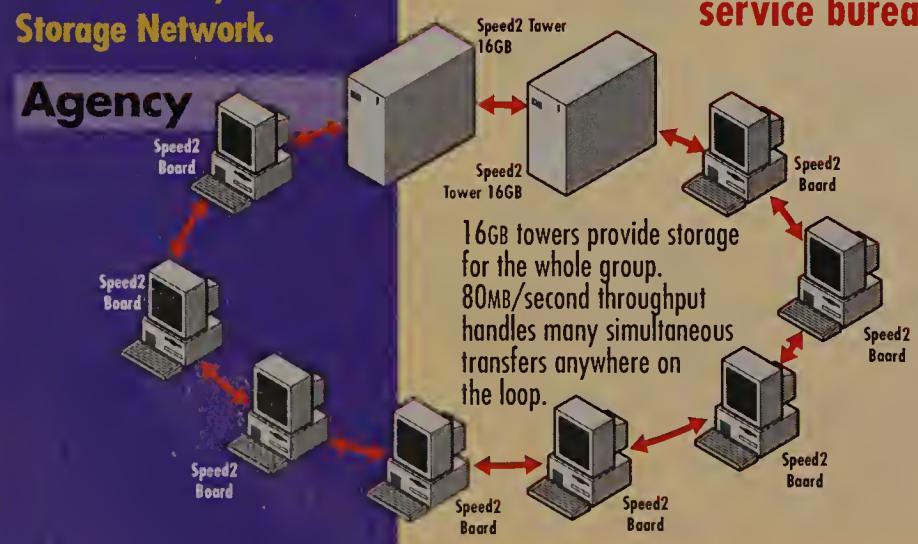

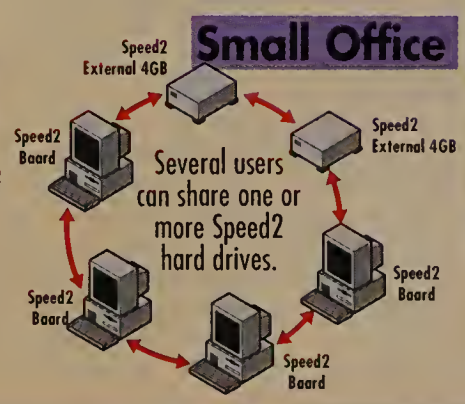

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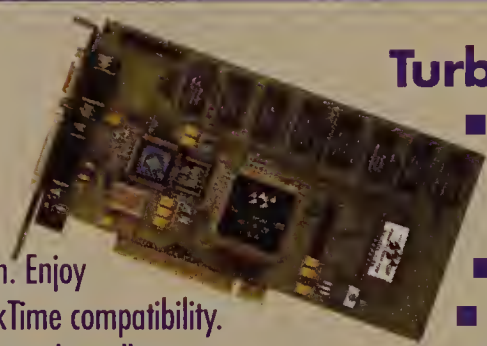

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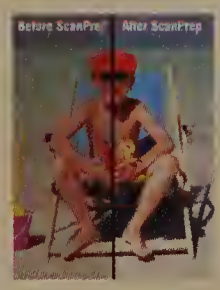

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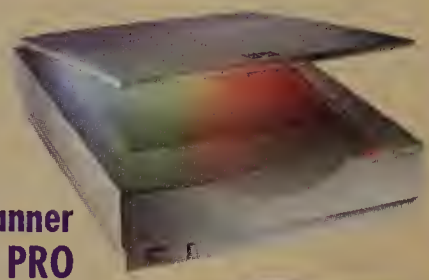

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AMONG THE NEW SYSTEMS:

(counterclockwise from top) Motorola's StarMax 3000 DT603e-200, Power Computing's PowerBase 240, Umax's SuperMac S900L 604/150, and Apple's Power Macintosh 9500/200.

47 Macs?

Don't despair: Macworld sorts through the confusion.

The Vast Mac Expanse

by Galen Gruman

AS INCREDIBLE AS IT MAY SEEM, YOU HAVE as many Mac models to choose from today—50, including three new PowerBooks—as Apple delivered over the course of the Mac's first ten years. Times certainly have changed, and the Mac clone market is now solidly established, even though it's still young. That means more choice in vendors, configurations, and features. That means lower prices, with solid-performance, complete Mac systems now available for close to $2000. And that means more speed, with CPUs ranging from 120MHz to 250MHz and getting faster.

To help you make sense of your Mac options, Macworld Lab has tested all available Mac systems, as well as some Mac models that have been announced but weren't shipping by our mid-September deadline. We also cover some systems announced but not available even in prototype form, since those systems should be available around the time you read this article. (For the latest in PowerBooks, see "Finally, a PowerBook with a CD," elsewhere in this issue.)

Keeping Up with the Joneses

The new realities of Mac clones mean you will hear about new systems months before you can actually get them. Case in point: Power Computing (*http://www.powercc.com*) announced its PowerBase systems in August, but the company was still working on the

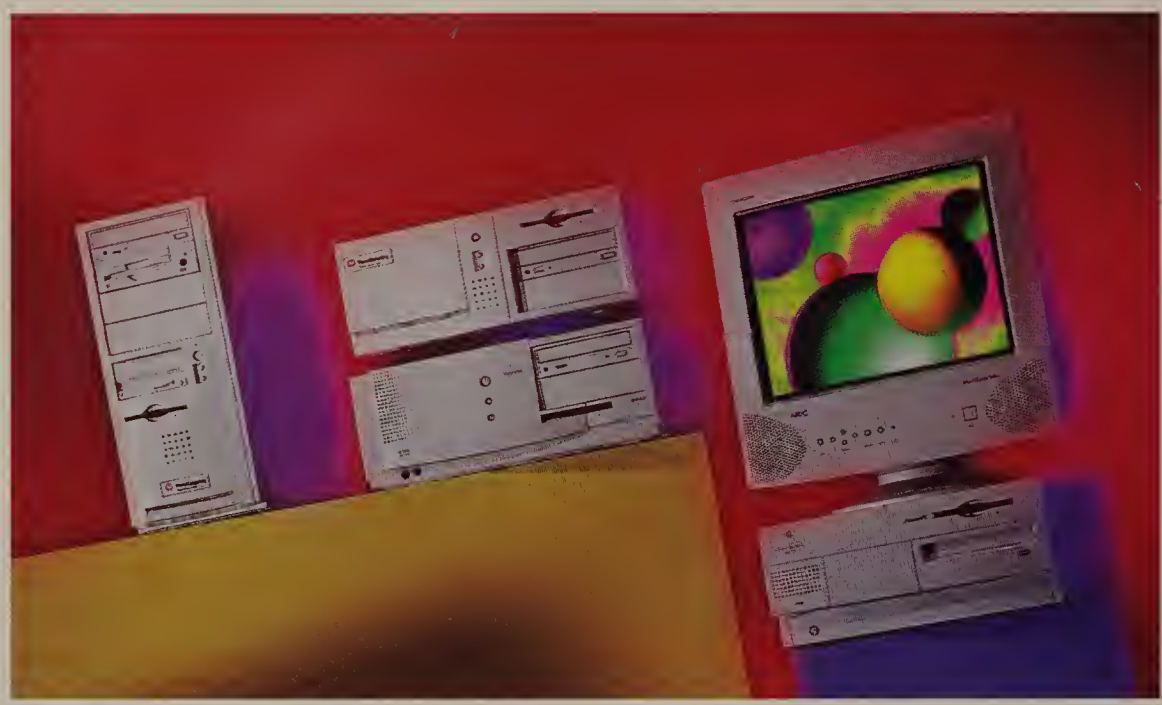
PHOTOGRAPHS BY KEVIN CANDLAND

video circuitry as we went to press six weeks later. They should ship in early October 1996. Umax Computer (*http://www.supermac.com*) similarly announced its C500 and C600 systems in August, but they won't ship until late October.

(You may have seen reviews of these systems elsewhere, but don't be fooled: those were prototypes. Between prototype and manufacture, both engineering and features can change. *Macworld* has already seen performance and feature updates in Power Computer's PowerBase series since its prototypes were "reviewed" elsewhere. *Macworld* only reviews and gives Star Ratings to real, shipping systems. We will test prototypes to gauge anticipated performance, but we will clearly identify those machines as such.)

Why are the announcements so early? Apple (*http://www.info.apple.com*) has long tried to announce systems only when it had enough to sell (although the company sometimes misjudged). But now that there are six companies selling Macs—Apple, APS Technologies (*http://www.apstech.com*) DayStar Digital (*http://www.daystar.com*), Motorola Computer Group (*http://www.mot.com/computer*), Power Computing, and Umax Computer—each is jockeying for attention.

As we go to press, of Power Computing's 12 announced systems, only 5 are shipping. Of Umax's 11 announced systems, only 3 are shipping. On the other hand, when Motorola had a big splash with its first 8 Mac systems last September (see "Motorola's Hot New Macs," *Macworld*, November 1996), it straightforwardly stated you couldn't actually buy a system until November 4. The latest entrant, APS Technologies, is also being straightforward that its three systems won't ship until November 5. All of Apple's announced systems were shipping, and 2 of DayStar's 4 announced models were available.



$2095 AND UP More choices mean better prices—pick from (left to right) Power Computing's $4995 PowerTower Pro 225 or $2095 PowerCenter 150 (an Editors' Choice selection), Umax's $3000 SuperMac J700 604/150, or Apple's $2999 Power Macintosh 7600/132.

Trying to figure out which Mac models are available when is an unavoidable side effect of a competitive Mac market. If you've ever shopped for a PC, you'll be familiar with this phenomenon. For a road map of the current options, see the table, "The Right Options: What Each Mac Offers."

"Low End" No More

While a lot of attention has been focused on the ever-faster systems—Umax recently showed a 250MHz PowerPC 604e–based system in a bid to steal the thunder from Power Computing's faster-than-any-PC 225MHz PowerTower Pro—the major shift in the Mac market this fall was in the so-called low end that was once the province of Apple's Performas. Every Mac maker except DayStar has come up with fast consumer-oriented systems for home and small-office users that perform at the same level as last year's high-end Macs.

The new 200MHz-plus PowerPC 603e–based systems are as fast as the Apple Power Mac 8500/150 and Power Computing PowerWave 150 speed demons of just a year ago. Result: you can no longer equate entry-level with underpowered. Instead, for about $2500, you can get a complete system that rivals the fast models many businesses bought last year. And there are even-cheaper versions that run a little slower—usually 140MHz or 160MHz—that still match or exceed the performance of a Power Mac 7500/100, last year's business standard.

Although entry-level computers are based on just two designs—after all, every clone but Motorola's and APS's (which use the Tanzania design) is based on the Apple Performa 6400's Alchemy design—the new Mac systems in this category offer real differences to choose from.

Apple Performa Apple has streamlined its Performa series significantly, a move we applaud because it decreases confusion. Currently there are only three models left: the 6320CD desktop system (the only survivor of the 6300 line) and the 6400/180 and 6400/200 tower systems. The 5300 series—which integrated the monitor and the system case into one unit—lives on as the Power Mac 5400 but is sold exclusively to schools.

The 6320CD is clearly an orphan. Priced the same as a faster 6400/180, it uses a nonstandard expansion bus (the LC III–style PDS of the original Performa line), is the slowest Mac available, and has almost no expansion capability (although it does feature a slide-out motherboard for card and RAM expansion). If you want a minimalist system, you can get one that's better in speed, price, and expandability—Power Computing's PowerBase series.

Available in 200MHz and 180MHz versions, the Apple Performa 6400, the first Performa tower, skimps on the VRAM (1MB unless you buy a card, which can cost about $500). But unique among anyone's Macs, the 6400 also includes a subwoofer in its base, as *Macworld* proposed in its future-Mac prototype three months ago (see "The Mac Reborn," September 1996).

The 6400 has the TV-tuner slot that Apple included in its previous Performas as part of its effort to merge computing with home entertainment. You can also buy a basic video-editing card and software bundle to go with the Performa 6400 or with any PCI-based Mac (see the review of the 6400 in November

MW LAB

Today's Macs Go Full Speed Ahead

Thanks to a rash of ever-faster new PowerPC CPUs from IBM and Motorola, coupled with their eager adoption by Power Computing and other Mac-clone makers, today's Macs offer super performance even at the $2000 level of consumer systems. And the $3500-and-higher systems simply fly.

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed in decreasing order of overall performance. Prototype systems (not shipping at press time) are in italics.

Today's New Macs	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
Umax SuperMac S900L 604/250	9.6	9.6	14.3	3.5
Power Computing PowerTower Pro 225	9.2	9.4	13.4	3.5
Umax SuperMac S900L 604/225	8.8	8.9	12.8	3.4
Power Computing PowerTower Pro 200	8.5	8.4	12.7	3.5
Umax SuperMac S900L 604/200	8.3	8.5	12.0	3.0
Power Computing PowerTower Pro 180	7.8	7.9	11.3	3.4
Apple Power Macintosh 9500/200	7.7	7.5	12.1	2.9
Motorola StarMax 4000 MT604e-200	7.5	7.7	11.0	2.6
Apple Power Macintosh 9500/180MP	6.9	7.0	9.7	2.8
Apple Power Macintosh 8500/180	6.7	6.6	10.3	2.4
DayStar Genesis MP 360+	7.4	7.7	9.8	3.1
DayStar Genesis MP 720+	7.3	7.6	10.0	3.1
Motorola StarMax 4000 DT604e-160	6.5	6.5	9.7	2.4
Umax SuperMac S900L 604/150	6.0	6.3	8.0	2.5
Umax SuperMac J700 604/150	6.0	6.2	7.9	2.7
Apple Power Macintosh 8500/150	5.9	6.1	8.1	2.5
Motorola StarMax 3000 MT603e-200	5.9	5.9	8.2	2.5
Power Computing PowerBase 240	5.7	5.7	8.7	2.2
Apple Performa 6400/200	5.6	5.6	8.1	2.6
Power Computing PowerCenter 150	5.6	5.9	7.5	1.8
Power Computing PowerBase 200	5.2	5.2	7.7	2.1
Motorola StarMax 3000 DT603e-160	5.1	5.2	7.3	2.1
Apple Power Macintosh 7600/132	5.0	5.1	6.9	2.5
Power Computing PowerBase 180	4.9	4.9	7.3	2.0
Apple Power Macintosh 7200/120	4.1	4.1	5.8	1.9
Apple Performa 6400/180	4.0	4.1	5.2	2.0
Apple Performa 6320CD	3.3	3.3	4.4	1.7
Selections from Yesterday				
Power Computing PowerTower 166	6.1	6.3	8.6	2.0
DayStar Genesis MP 600	5.5	5.8	7.0	2.2
Apple Power Macintosh 8500/132	5.4	5.7	7.1	2.4
Power Computing PowerWave 150	4.9	4.8	7.4	2.2
Apple Power Macintosh 9500/132	4.8	4.7	7.1	2.3
Apple Power Macintosh 7500/100	3.5	3.2	5.5	1.9
Radius 81/110	3.3	3.1	5.1	1.8
	Indicates typical performance in a mixed-use environment, such as a company or school.	Indicates performance for most business and personal tasks.	Indicates performance for analytical, 3-D, and other specialized uses.	Indicates performance of the Mac's data-transfer capability, which affects all users.

Behind Our Tests

Macworld Lab tests several functions in eight key applications plus the Finder to determine real-world performance for the three critical performance areas faced by most users: the CPU-Intensive tasks evaluate the Mac's essential computing performance; the FPU-Intensive tasks gauge performance for operations that take advantage of the floating-point unit; and the Disk-Intensive tasks gauge the performance you'll get launching programs, opening and closing files, and copying files.

We then average the results to determine the Overall Score, giving the CPU-Intensive score 60 percent of the weight and the FPU and disk scores 20 percent each. These results are comparable with *Macworld* benchmarks published since the January 1995 issue. We test native versions of software on Power Macs and 680X0 versions for 040 Macs. The software includes System 7.5; Adobe Illustrator 5.5, PageMaker 5.0a, Photoshop 3.0, and Premiere 4.0; Fractal Design Painter 2.0; Microsoft Excel 5.0; Specular International Infini-D 2.6; and Wolfram Research Mathematica 2.3. Our Power Macs have 24MB of RAM, while 680X0 Macs have 16MB. All systems were run with 8-bit color on 17-inch color monitors.—**Macworld Lab testing supervised by Mark Hurlow and Chris Uiterwijk**

1996), which costs about $450.

As with the Performa 6320CD, you can slide out the motherboard to add RAM or cards. And like the 6320CD, the 6400 includes a 28.8-Kbps modem.

Where Apple skimps is in expandability: there are a mere two PCI slots and a mere one free drive bay. You can't upgrade the CPU. And the internal SCSI connector supports just one drive; it shares the same bus as the external connector, which is limited to five devices, unlike most Macs' limit of seven for the external connector. The internal hard and CD-ROM drives don't use SCSI; instead, they share an Enhanced IDE (EIDE) connector. Unlike SCSI, EIDE circuits can support only two devices. The EIDE standard common on PCs has been finding its way into several Macs from Apple—from PowerBooks to Performas—and now it's in the clone market.

For performance, the 6400/200 is moderate—it falls between the prototype 200MHz StarMax 3000 and PowerBase systems. But the 6400/180's speed tumbles precipitously, making it the next-to-slowest 603e-based system available, period (see the benchmark, "Today's Macs Go Full Speed Ahead").

Apple Power Macintosh 7200/120

The last Mac based on the PowerPC 601, the Power Mac 7200/120 was meant to be

The Right Options: What Each Mac Offers

Company	Product	Star Rating[B]	Price[C]	CPU Type: 604e	CPU Type: 604	CPU Type: 603e	CPU Type: 601	SPEED-RELATED FEATURES: CPU Speed	Cache	Bus Speed	RAM: 32MB	RAM: 16MB	MEMORY: RAM Slots
Apple Computer	Power Macintosh 9500/200	★★★/6.6	$4899	●				200MHz	512K	50MHz	●		12
408/996-1010	Power Macintosh 9500/180MP	★★★★/7.4	$5699	2				180MHz	512K	45MHz	●		12
	Power Macintosh 8500/180	★★★/6.3	$4499	●				180MHz	256K	45MHz	●		8
	Power Macintosh 8500/150	★★★/5.8	$3599		●			150MHz	256K	50MHz		●	8
	Power Macintosh 7600/132	★★★/5.9	$2999		●			132MHz	256K	44MHz		●	8
	Performa 6320CD	★★/4.6	$2499			●		120MHz	256K	40MHz		●	2
	Performa 6400/200	★★★★/7.1	$2919			●		200MHz	256K	40MHz		●	4
	Performa 6400/180	★★★/6.5	$2499			●		180MHz	256K	40MHz		●	4
	Power Macintosh 7200/120	★★/4.6	$2299				●	120MHz	256K	40MHz		●	4
APS Technologies	MPower 604e200	not shipping	$2599	●				200MHz	512K	40MHz		24	3[G]
816/483-1600	MPower 603e200	not shipping	$1599			●		200MHz	256K	40MHz		●	3[G]
	MPower 603e160	not shipping	$1399			●		160MHz	none	40MHz		●	3[G]
DayStar Digital[I]	Genesis MP 800+	not shipping	$12,314	4				200MHz	512K	50MHz		●	12
770/967-2077	Editors' Choice												
	Genesis MP 720+	★★★★/7.4	$10,714	4				180MHz	512K	45MHz		●	12
	Genesis MP 400+	not shipping	$5499	2				200MHz	512K	50MHz		●	8
	Genesis MP 360+	★★★★/7.2	$7814	2				180MHz	512K	45MHz		●	12
Motorola Computer Group	StarMax 4000 MT604e-200	not shipping	$3595	●				200MHz	512K	50MHz	●		3[G]
800/759-1107	StarMax 4000 DT604e-200	not shipping	$3195	●				200MHz	512K	50MHz		●	3[G]
	StarMax 4000 MT604e-160	not shipping	$2995	●				160MHz	512K	40MHz	●		3[G]
	StarMax 4000 DT604e-160	not shipping	$2595	●				160MHz	512K	40MHz		●	3[G]
	StarMax 3000 MT603e-200	not shipping	$2395			●		200MHz	256K	50MHz	●		3[G]
	StarMax 3000 DT603e-200	not shipping	$1995			●		200MHz	256K	50MHz		●	3[G]
	StarMax 3000 MT603e-160	not shipping	$1895			●		160MHz	256K	50MHz	●		3[G]
	StarMax 3000 DT603e-160	not shipping	$1595			●		160MHz	256K	50MHz		●	3[G]
Power Computing[I]	Editors' Choice												
512/388-6868	PowerTower Pro 225	★★★★/7.9	$4995	●				225MHz	1MB	45MHz		●	8
	PowerTower Pro 200	★★★★/7.7	$4495	●				200MHz	1MB	50MHz		●	8
	PowerTower Pro 180	★★★★/7.6	$4195	●				180MHz	1MB	51.4MHz		●	8
	PowerTower 200e	not shipping	$3595	●				200MHz	1MB	50MHz		●	4
	PowerTower 180e	not shipping	$3295	●				180MHz	1MB	45MHz		●	4
	PowerCenter 180	not shipping	$2795		●			180MHz	512K	45MHz		●	4
	PowerCenter 166	not shipping	$2395		●			166MHz	512K	41.5MHz		●	4
	Editors' Choice												
	PowerCenter 150	★★★★/7.3	$2095		●			150MHz	512K	50MHz		●	4
	PowerCenter 132	★★★★/7.1	$1895		●			132MHz	512K	44MHz		●	4
	PowerBase 240	not shipping	$2295			●		240MHz	256K	40MHz		●	3
	PowerBase 200	not shipping	$1895			●		200MHz	256K	40MHz		●	3
	PowerBase 180	not shipping	$1595			●		180MHz	256K	40MHz		●	3
Umax Computer	SuperMac S900L 604/250	not shipping	NA	●				250MHz	512K	50MHz	●		8
510/226-6886	SuperMac S900L 604/225	★★★★/8.0	$4495	●				225MHz	512K	45MHz	●		8
	Editors' Choice												
	SuperMac S900L 604/200	★★★★/7.8	$3995	●				200MHz	512K	50MHz	●		8
	SuperMac S900L 604/180	not shipping	$4000	●				180MHz	512K	45MHz	●		8
	SuperMac S900L 604/180DP	not shipping	$4695	2				180MHz	512K	45MHz	●		8
	SuperMac S900L 604/150	★★★/6.9	$3495		●			150MHz	512K	50MHz		●	8
	SuperMac J700 604/150	not shipping	$3000		●			150MHz	512K	50MHz		●	8
	SuperMac C600/200	not shipping	$2600			●		180MHz	256K	40MHz		●	2
	SuperMac C600/180	not shipping	$2200			●		180MHz	256K	40MHz		●	2
	SuperMac C600/160	not shipping	$1700			●		180MHz	256K	40MHz		●	2
	SuperMac C500/140	not shipping	$1500			●		140MHz	256K	40MHz		●	2

● = yes; NA = not available. [A] Unless otherwise noted, all include the following ports: one ADB, two serial, one external SCSI-1, two 16-bit stereo I/O, and one Mac video port. [B] Based on features, imp company estimates, except for those from APS, DayStar Digital, and Power Computing, which are direct prices. Power Macintoshes don't include keyboards. [D] All systems without on-board video come wit which are not compatible with other Macs' 5V DIMM slots. [H] Has only a VGA video connector. [I] Other configurations are available. [J] Low-profile desktop configurations (no free drive bays) available fo

VIDEO DISPLAY		STORAGE					EXPANSION[A]					COMMUNICATIONS	
			Hard Drive		CD-ROM Drive				Internal Bus				
VRAM (std/max)	On-board Circuitry[D]	Free Bays	1.0GB–1.9GB	2.0GB–2.9GB	8×	Other	Case	PCI Slots	SCSI-2	SCSI-1	EIDE	Modem	Ethernet
2MB/4MB		2		2.0GB	●		tower	6	●				●
2MB/4MB		2		2.0GB	●		tower	6	●				●
2MB/4MB	●	1		2.0GB	●		tower	3	●				●
2MB/4MB	●	1	1.2GB		●		tower	3	●				●
2MB/4MB	●	1	1.2GB		●		desktop	3	●				●
1MB/1MB	●	0	1.2GB			4×	desktop	0				●	
1MB/1MB	●	1		2.4GB	●		tower	2[E]		●[F]		●	
1MB/1MB	●	1	1.6GB		●		tower	2[E]		●[F]		●	
1MB/4MB	●	1	1.2GB		●		desktop	3					●
2MB/4MB	●[H]	5		2.5GB	●		tower	5			●		
1MB/4MB	●[H]	3	1.2GB		●		desktop	3			●		
1MB/4MB	●[H]	3	1.2GB		●		desktop	3			●		
4MB/4MB		7		2.0GB	●		tower	6	●				●
4MB/4MB		7		2.0GB	●		tower	6	●				●
4MB/4MB		2		2.0GB	●		tower	6	●				●
4MB/4MB		7		2.0GB	●		tower	6	●				●
2MB/4MB	●[H]	3		2.5GB	●		tower	5			●		
2MB/4MB	●[H]	1	1.2GB		●		desktop	3			●		
2MB/4MB	●[H]	3		2.5GB	●		tower	5			●		
2MB/4MB	●[H]	1	1.2GB		●		desktop	3			●		
1MB/4MB	●[H]	4		2.5GB	●		tower	5			●	●	
1MB/4MB	●[H]	4		2.5GB	●		desktop	3			●	●	
1MB/4MB	●[H]	4		2.5GB	●		tower	5			●	●	
1MB/4MB	●[H]	4		2.5GB	●		desktop	3			●	●	
8MB/8MB		3		2.0GB	●		tower	6	●				●
8MB/8MB		3		2.0GB	●		tower	6	●				●
8MB/8MB		3		2.0GB	●		tower	6	●				●
2MB/4MB	●	3		2.0GB	●		tower	3	●				●
2MB/4MB	●	3		2.0GB	●		tower	3	●				●
1MB/4MB	●	3	1.0GB		●		desktop	3	●				●
1MB/4MB	●	3	1.0GB		●		desktop	3	●				●
1MB/4MB	●	3	1.0GB		●		desktop	3	●				●
1MB/4MB	●	3	1.0GB		●		desktop	3	●				●
2MB/4MB	●	3	1.2GB		●		tower[J]	3	●		●		
2MB/4MB	●	3	1.2GB		●		tower[J]	3	●		●		
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1MB/1MB	●	2	1.2GB		●		tower	3	●		●		
1MB/1MB	●	0	1.2GB		●		desktop	1	●		●		

mentation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) [C] *All prices are a PCI video card installed.* [E] *Short (7-inch) cards only.* [F] *SCSI-1 allows only one drive to be connected.* [G] *Uses 3.3-volt DIMMs, $100 less.*

Apple's entry-level business system. But the Performa 6400 and other 603e-based systems have made this model almost pointless. Close in price and performance to the Performa 6400/180, the 7200 has better expansion for PCI and video, but no niceties like a keyboard, modem, subwoofer, and slide-out motherboard.

APS MPower 603e APS is doing something Motorola expects several other companies to do: buy Motorola's StarMax motherboards, or even complete systems, and resell them under its own name. APS uses Motorola motherboards and adds cases and internal components. Thus, APS's two MPower 603e systems are essentially the same as the StarMax 3000 desktop models, with minor variations (such as hard-drive brand and RAM amount) and without a modem. No prototypes were available for testing.

Motorola StarMax 3000 Motorola's new consumer Macs offer low prices—lower even than some Power Computing configurations, especially when you factor in the bundled 28.8-Kbps modem. (Power Computing may bundle a 33.6-Kbps modem in its PowerBase series.) And the performance of three of the four StarMax 3000 models outshines that of even the PowerBase 240, despite the StarMax's lower CPU speed. That's partly due to the StarMax's faster hard drive and partly due to its new Tanzania motherboard architecture.

But the StarMax series does cut some corners: there's only 1MB of video RAM, versus 2MB in the PowerBase series. Fortunately, you can expand the VRAM by getting a new SIMM. The StarMax series also lacks an internal SCSI connector, and its EIDE connector is full, since it is used by the hard drive and CD-ROM drive. This means you'll need a PCI SCSI card to add internal drives, as well as a PCI card to add Ethernet. It's a good thing the StarMax 3000 series' tower models offer more PCI slots (five) than competing tower systems (two on the Performa 6400 and three on the PowerBase).

Macworld Lab did discover one major issue with the StarMax systems: the DIMM slots are not compatible with other Macs' or Mac clones' DIMMs. That means you can't move memory from a StarMax system to another Mac, or vice versa. The reason is that Motorola uses more power-efficient 3.3-volt DIMMs, which aren't compatible with (and won't fit in) other Macs' 5V RAM slots.

Power Computing PowerBase These newest 603e-based systems target business-level speed, topping out at 240MHz—almost as fast as a 604-based Power Mac 8500/150. They also target gamers, thanks to their built-in 3-D–acceleration video circuitry.

Be aware that the PowerBase's top-speed CPUs don't necessarily mean top system performance; the 240MHz PowerBase prototype we tested wasn't as fast as a 200MHz Motorola StarMax 3000 prototype and was barely faster than a 200MHz Apple Performa 6400. The PowerBase's slower performance is surprising, since it is based on the same Alchemy motherboard as Apple's Performa 6400 (and as Umax's forthcoming C500 and C600 systems). (Power Computing insists its final PowerBase systems will perform at or above the level of a Performa 6400 or StarMax 3000; we'll test that assertion when they finally ship.)

The PowerBase has almost the right amount of expandability: three PCI slots, 2MB of VRAM that can be increased to 4MB, an upgradable CPU, a VGA video connector in addition to a standard Mac video connector, and three free bays for extra internal drives.

Umax C500 and C600 Umax has also jumped into the consumer-system fray with two series of moderate-performance Macs. While these systems weren't available for testing, they appear to be very similar to Motorola's StarMax offerings. The chief differences: the CPU is upgradable and there is an internal SCSI connector, but there is no bundled modem and there are only three PCI slots in the C600, one in the C500.

Unfinished Race At this point, the top contenders for consumers are the StarMax 3000 series, the MPower 603e series, and the PowerBase series. The basic trade-off is price/performance versus expandability. The StarMax and MPower 603e win on the former, but the PowerBase wins on the latter. Because none of these Macs are shipping, we can't give an Editors' Choice designation—yet.

Moreover, the decision will be made more difficult in the short run by the constantly changing clone landscape. Expect to see a series of companies like APS, including some mail-order firms, make clones based on Motorola designs in the next few months. IBM also hopes to create a similar business for itself, selling Mac motherboards to other companies. Already, Akia, an IBM licensee, will build Mac OS–based laptops and desktops for the Japanese market (see "First Mac for Just $1400," *News*, in this issue).

The High-End Race Continues

If you're a professional who needs a lot of power—for publishing, engineering, or Web work—the Macs you can buy today are a quantum leap ahead of those of just a year ago. Already companies are promising Macs with 250MHz PowerPC 604e CPUs, and several expect to have 300MHz systems by the end of the year. For the first time in memory, new hardware has sped up faster than new software can slow it down.

But while machines are faster, designs are pretty much the same. Unlike the consumer market, in which there are new-from-the-ground-up systems from four Mac makers, in the business market the new Macs are faster versions of systems that have been around for a while. That makes choosing a new system easier: look for the fastest version of the system you already know is right for you.

In "Pinnacles of Power" (in this issue), *Macworld* picks the ultimate in performance for publishers, image editors, multimedia authors, and Web servers. In that camp, you have the newest PowerPC 604e systems to select from. Here, we choose the best general-purpose business Mac, the one that most people should have on or next to their desk. Generally speaking, that means a system based on a 166MHz or slower 604 or 604e. Obviously, there's some overlap between high-end and business systems, so be sure to read both articles.

The significant differences among business-oriented Macs come down to speed, expandability, price, and options.

AND TOWERS FOR ALL Just as with PCs, low-end users aren't limited to desktops anymore, as evidenced by Apple's first Performa tower, the 6400/180 (left), and Motorola's 200MHz StarMax 3000 MT603e-200 (right).

You will also need to choose between a desktop case and a tower case. For most people, it's a matter of taste, not function. Only a few systems have notable differences in expansion: the Umax SuperMac J700 desktop, for example, is the only desktop to have more than three PCI slots, while all business-level towers except the PowerTowers have at least five PCI slots.

Apple Power Macintosh 7600 and 8500 The Power Mac 7600's original incarnation—the 7500/100—a year ago was my favorite business Mac, so much so that I bought one. That's changed. Now equipped with a 132MHz PowerPC 604 CPU, it costs the same as it did a year ago, and other clones offer more value for less. That's partly because Apple charges premium prices—in this case, it had to for the extra AV circuitry in this machine, but most of us will never use that circuitry. Some time next year, Apple will likely deliver a system based on the Power Mac 7600 but without the extra AV costs (see "New Apple Systems on the Horizon," *News*, in this issue).

Business users might also be tempted by the 150MHz model of the Power Mac

8500. But that's even pricier than a 7600 and has more technology you won't use.

Motorola StarMax 4000 The newest kid on the Mac block, Motorola, offers two 160MHz 604e systems, the DT604e-160 desktop and the MT604e-160 tower. They're identical except for the hard drive size, included RAM, and number of PCI slots. Two 200MHz models are also available, but these more properly belong in the power-use category.

The StarMax 4000 lacks an upgradable CPU, which you may want in this time of fast-changing CPU speeds (despite the high cost of new CPU cards), and an internal SCSI connector. You'll need a card to add SCSI drives to its internal bays and to add Ethernet, as well as an adapter to connect to a standard Mac monitor.

Adding these components would make the StarMax 4000 cost about the same as a comparably equipped SuperMac J700—but about $1000 more than a comparable PowerCenter 150. When the StarMax 4000 series actually ships, *Macworld* will make a final recommendation. Likewise, the tower model costs about the same as competing models from Power Computing and Umax when you add in the missing components. If you don't need these components, you get a better deal with the StarMax.

Power Computing PowerCenter The oldest offering of today's Mac lines, Power Computing's PowerCenter 150 offers three PCI slots, Mac and VGA video connectors, 1MB of VRAM, a 512K cache, an 8× CD-ROM drive, built-in Ethernet, three free drive bays, and a 1GB hard drive for $2095.

You'll want another 1MB of VRAM to power a 17-inch monitor at thousands or millions of colors and probably a larger (2GB) hard drive—which together will cost you another $250—but that's still about $500 cheaper than Apple's slower Power Mac 7600/132 and Umax's not-yet-shipping SuperMac J700.

In addition to solid performance and solid features, you get more free drive bays with a PowerCenter (three) than with a J700 (two) or 7600 (one).

If 150MHz makes you feel slow, Power Computing will be happy to sell you one of its new PowerCenter models. By the time you read this, the company expects to ship 166MHz and 180MHz versions of the PowerCenter. Except for the CPU speed and price, they're identical to the PowerCenter 150. Power Computing also offers a 132MHz PowerCenter, but the company plans to discontinue this model by December.

Power Computing PowerTower The company recently revised its PowerTower series' CPUs to 180MHz and 200MHz, but it can't get enough CPUs to deliver them to customers—or *Macworld*—yet. These systems should be very powerful—more so than any desktop except for Motorola's StarMax 4000 DT604e-200—and likely are overkill for most users. The PowerTower Pros with six PCI slots are definitely overkill.

Umax SuperMac J700 Umax's first desktop system is essentially a version of the company's SuperMac S900L in a desktop case. You get six PCI expansion slots (the only desktop to offer that), as in the S900L towers, but less RAM than most (16MB versus 32MB), less VRAM (2MB versus 4MB), and fewer free drive bays (two versus four). The prototype that Macworld Lab tested crashed frequently, and neither we nor Umax could resolve the problem at press time. We'll let you know in a later review if the shipping version is stable.

Umax SuperMac S900L Comparable to the PowerTower Pros, most of these systems also deliver more performance than most business users need. However, the 150MHz model makes a strong case as a business user's tower of choice, offering a lot of expansion room at a decent price, with performance comparable to other 150MHz systems'.

Clear Winner So what's the best choice? Simple: the PowerCenter 150 from Power Computing. Surprised we didn't pick a faster system? Unless you're doing the kind of work we cover in "Pinnacles of Power," a 150MHz 604-based system is plenty fast. For now, Power Computing remains the business leader.

The Last Word

Choice is a blessing and a curse. Never before have we had so many Mac options to choose from. And this is just the first wave. When the first Macs based on the Common Hardware Reference Platform (CHRP) standard appear—now expected by July 1997—even more choices from even more vendors should be available. **m**

Executive editor GALEN GRUMAN survived the early PC clone years and is looking forward to the Mac's similar journey.

MACINTOSH SYSTEMS

To choose the best Macs of the multitudes becoming available, we gauge several factors: speed, expandability, price, and total feature set. The best systems offer lots of features for the least money. For the details on how we determined our picks for power-user systems, see "Pinnacles of Power," elsewhere in this issue.

Consumer Systems

No Choice Only Apple had systems shipping as we went to press, but the competition looked too promising for us to give the prize to Apple by default.

Business System

★★★★/7.3 **PowerCenter 150** Even with all the new Mac models available, none yet matches the Power Computing desktop's balance of price, performance, and features. **Company:** Power Computing (512/388-6868, *http://www.powercc.com*). **Direct price:** $2095.

Multimedia/Video-Creation System and Education System

★★★★/7.4 **Genesis MP 720+** The ultimate Mac system speeds through multiprocessor (MP)–enabled programs like Adobe Photoshop, After Effects, and Premiere, and Strata StudioPro Blitz. Its high expandability means you could equip it with an internal RAID system and with a recordable CD-ROM drive and still have free bays. For non-MP programs, though, it performs like any single-CPU Mac. **Company:** DayStar Digital (770/967-2077, *http://www.daystar.com*). **Company's estimated price:** $10,714.

Publishing and Design System

★★★★/7.9 **PowerTower Pro 225** The fastest single-CPU Mac offers the top performance needed for publishing professionals at a great price. **Company:** Power Computing (512/388-6868, *http://www.powercc.com*). **Direct price:** $4995.

Web/Intranet Server System

★★★★/7.8 **SuperMac S900L 604/200** With great performance at a great price, plus a simple-to-upgrade case design and plenty of expansion capability, this system is well suited to being a departmental intranet or moderate-demand Web server. **Company:** Umax Computer (510/226-6886, *http://www.supermac.com*). **Company's estimated price:** $3995.

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—C. David Piña, designer

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Circle 105 on reader service card

Finally, a PowerBook with a CD

MACWORLD TAKES THE NEW POWERBOOK 1400 FOR A SPIN

by Cary Lu

KEVIN CANDLAND

APPLE NO DOUBT HOPES the key new feature on its three new PowerBook 1400's—an optional 6× CD-ROM drive—will distract people from comparing the new laptops with their ill-fated predecessor, the PowerBook 5300. Obviously, only time will tell whether Apple's (408/996-1010, *http://www.apple.com*) new quality-control measures have overcome the design and manufacturing problems that plagued the 5300.

The PowerBook 1400 has a completely new design that presses neither technology limits and performance boundaries nor pocketbooks. For example, the battery is nickel–metal-hydride; there's no provision for the lithium-ion batteries whose cells caused problems in the 5300. And the performance pretty much matches the 5300's (see the benchmark, "PowerBook 1400: No Performance Boost"). Macworld Lab tested a late prototype of the version set to ship October 21 and found it to be a mix of new and old, good and bad (to learn about other new systems, see "The Vast Mac Expanse," elsewhere in this issue).

What's New

In the realm of PowerBooks, the 1400 is both more upgradable and easier to upgrade than previous versions. To get at the insides, you slide out a panel above the keyboard, lift out the keyboard, and then take out six screws and remove the heat sink. The standard-issue 117MHz PowerPC 603e processor (no cache) sits on a daughterboard; Newer Technology (316/943-0222, *http://www.newertech.com*) says it plans to offer faster CPUs with a cache in the future.

Inside, the memory arrangements are flexible but complicated. The motherboard holds 8MB, but there's space for three more memory boards in the two-sided memory bay. On the left side of the bay, Apple will install either a 4MB or an 8MB board for a total of 12MB or 16MB of RAM. The right side ships empty, but you can add memory using two stackable cards (that way, you don't have to remove memory to add more). You can swap those stackable right-side cards, but you can't use memory built for the left-hand bay in the right-hand bay, and vice versa. You can install a maximum of 64MB of memory (two 24MB cards on the right, one 8MB on the left, and the 8MB on the motherboard).

The PowerBook 1400 also features an internal expansion slot, which can accommodate an optional 8-bit video card. Both Focus Enhancements (617/

938-8088) and Newer Technology plan a 10BaseT internal Ethernet card. Newer also plans a 16-bit video card (up to 824 by 632; 8 bit on larger screens) and a combo video-and-Ethernet card. Prices were not available at press time.

On the outside, the screen has increased to 11.3 inches (measured diagonally), with 800 by 600 pixels in thousands of colors, available in either passive matrix or active matrix versions. The passive matrix screen works surprisingly well; though the more expensive active matrix screen is clearly better, passive matrix is not the compromise it's been in the past. Monochrome screens have disappeared for the 1400 and probably all future PowerBooks.

The 6× CD-ROM drive fits into the right-side drive bay under the keyboard and palm rest; the same bay can accommodate a floppy drive or other storage devices. VST Technologies (508/263-9700, *http://www.vsttech.com*) will offer hard-disk drives (1GB initially, 2GB later), Zip drives (in early 1997), and magneto-optical drives (230MB initially, 640MB in mid-1997). You can swap any of these when the PowerBook is in sleep mode, and aside from the floppy, all drives—including the internal hard disk—use an IDE interface. You can store a second battery in the drive bay, but it will neither supply power nor recharge—it's for passive storage only.

Beyond the CD-ROM drive, the PowerBook 1400 does have one novel feature: you can put artwork or photographs under a transparent top cover (behind the screen) to personalize the computer. But because of the new design, most of the components—the battery, drive bays, memory slots, and internal expansion slot—take devices that are specific to the 1400.

What's Old

Other features and capabilities are familiar from the 5300 series. The PC Card slot takes the same cards (two Type II or one Type III). The infrared IRTalk interface does not support the industry-standard IrDA interface, nor does the single serial port support GeoPort devices. A Kensington security slot sits on the back panel along with an ADB and a SCSI port. The external keyboard and 16-bit stereo sound-input and -output jacks remain the same.

Some features are upgraded from the 5300. The door covering the ports tucks into the computer when open, like the door on the Duo; Apple swears this door won't break or fall off, as it has with many previous models. The TrackPad is the kind you can tap, previously used in the PowerBook 190, not the kind on the 5300, which you couldn't tap.

With an overall weight of 6.9 pounds with a CD-ROM drive or 6.5 pounds with a floppy drive, the 1400 series falls in the middle of the laptop pack for the features it offers. At $2499, the 1400cs comes with a passive matrix display, 12MB of RAM, a 750MB hard drive, and a floppy drive. To get the CD-ROM drive, you need the $2899 version of the 1400cs, which also has 16MB of RAM, a 1GB hard drive, and the floppy drive. For $3499, the PowerBook 1400c comes with an active matrix screen and a 1GB hard drive.

To expand the 1400 line, you'll pay $349 for the CD-ROM drive, $149 for the video card, $299 for 8MB of RAM, and $149 for a second battery.

The Last Word

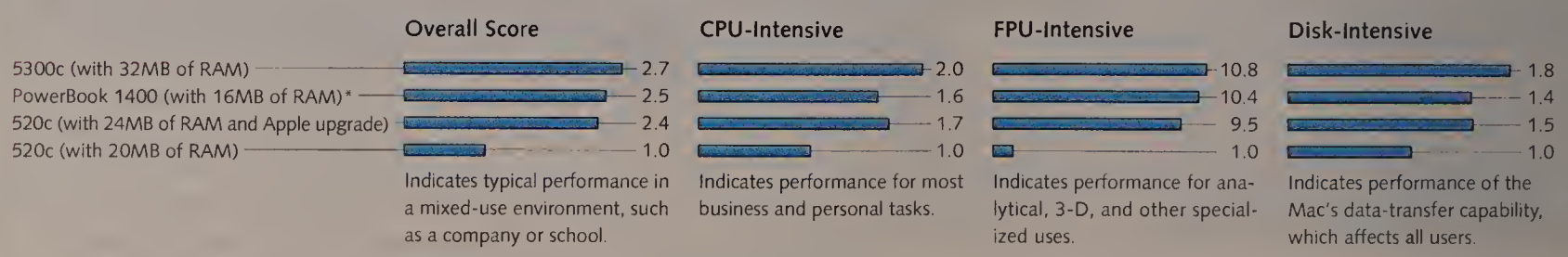
I found the 1400 familiar to operate; most of the features I liked and disliked about recent PowerBooks haven't changed. The bigger screen helps, and the CD-ROM plays audio CDs nicely. In an informal test, I ran the 1400 for 2 hours, 7 minutes on one battery, playing audio CDs continuously and working on the computer most of the time (Apple quotes battery life as 2 to 4 hours). One flaw in ergonomics: there are no foldout feet to tilt up the 1400, so the keyboard always lies flat on a table. I found this typing position uncomfortable on standard-height tables.

For now, if you want a PowerBook, you have to choose between the 1400 models or the older PowerBook Duo 2300c. The 1400 has been developed as a lower-cost PowerBook; Apple's high-end model, code-named Hooper, will appear next year with faster processors (cache included) and an internal PCI bus expansion slot (which will take yet another custom-size board). The Hooper was supposed to be out this fall, but no doubt Apple hopes the 1400 will also distract us from that. **m**

Contributing editor CARY LU thinks laptops need about ten more years of development before they become really great tools.

PowerBook 1400: No Performance Boost

Longer bars are better. Results are times as fast as a PowerBook 520c with 20MB of RAM (PowerBook 520c = 1.0). Products are listed in decreasing order of overall performance.



Since the PowerBook 1400 came with less memory than is required for our tests, virtual memory was used for some applications.

Behind Our Tests

Native versions of business applications were used to test PowerPC-equipped units; 680X0 versions were used for the PowerBook 520c reference system. (Since FileMaker Pro 3.0 was used in this benchmark, results should not be compared with previous PowerBook benchmarks, which used FileMaker Pro 2.13.)—**Macworld Lab testing supervised by Chris Uiterwijk**

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Circle 83 on reader service card

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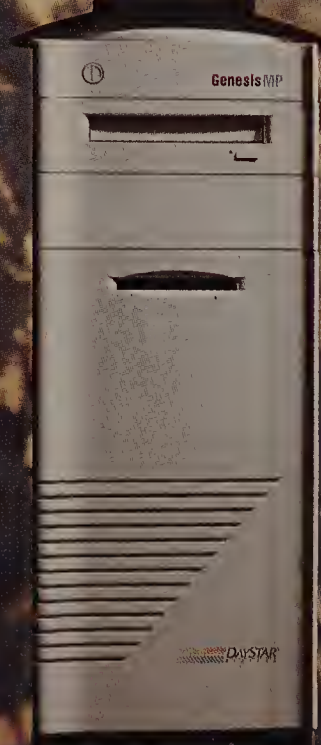
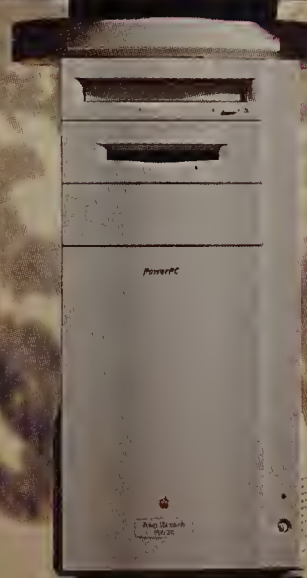
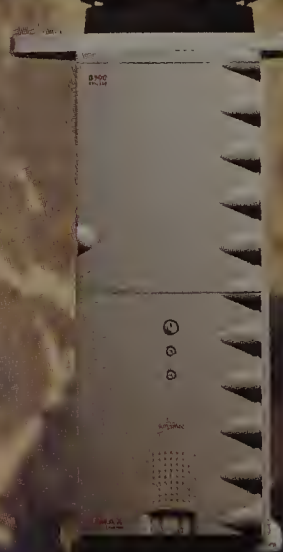
Circle 38 on reader service card

Reaching the summit. From left, the DayStar Digital Genesis MP 720+, Apple Power Macintosh 9500/200, Umax SuperMac S900L 604/200, and Power Computing PowerTower Pro 225.







Pinnacles

PHOTOGRAPHY BY PAUL FRANZ-MOORE | SCREEN IMAGES BY SCOTT MORGAN | BACKGROUND PHOTO BY FPG

by Deke McClelland

Macworld Lab selects the fastest Macs for your most demanding tasks

# of Power

ADMIT IT. You have a thing for speed. Travel fast, work fast, live fast. But in real life, speed has a price. Speed is dangerous, so naturally speed is discouraged. Well, in case you haven't figured it out yet, computers aren't real life. A fast computer has just one drawback—the money it sucks out of your bank account. Otherwise, the most fleet-footed processor threatens only your helpless and puny data.

So go for it. Let your next computer take you all the way.

To aid you in your pursuit, Macworld Lab has assembled the best Macs money can buy. We selected mighty Macintosh workstations that can handle such rigors as professional imaging and multimedia authoring without breaking a sweat. In most cases, CPUs slower than 200MHz had to come in pairs or better to compete.

Spurning price and other petty temporal concerns, Macworld Lab invited each of the four Mac system vendors to submit its fastest system for our review. Even the hot-wired Macworld Lab had to work overtime to keep up with the lightning pace of progress—we ultimately settled on six contenders from Apple (*http://www.apple.com*), Power Computing (*http://www.powercc.com*), Umax (*http://www.supermac.com*), and DayStar Digital (*http://www.daystar.com*).

Naturally, our tests represent a snapshot in time. Expect faster machines within months (at most) of reading this story. Both Power Computing and Umax plan 250MHz machines soon, and multiprocessing machines will become faster and more varied. So we're really looking at families of computers. Also, bear in mind that some of these machines may be in short supply. Expect ordering delays of a month or more for most of these models.

We leveled the playing field by equipping each machine with equal amounts of RAM and a lone 2GB hard drive, but the CPUs, logic boards, internal cache, video boards, and other essentials came directly from the vendors—representing their choices for top performance.

MW LAB

We evaluated the contenders in each of three processor-intensive categories: imaging and 3-D graphics, electronic publishing and design, and multimedia authoring and digital video; all but DayStar participated in the Internet content delivery category. (For detailed test results, see *http://www.macworld.com/pages/articlelinks/pinbench.gif* and *http://www.macworld.com/pages/articlelinks/pinbench2.gif*.) Macworld Lab conducted its usual hands-on tests to emulate real-world experience as closely as possible. (There was CONTINUES ON PAGE 131

The fastest single-processor Mac, Power Computing's PowerTower Pro 225 rose to publishing's heights.

Ultimate Electronic Publishing and Design

Best result in test. Longer bars are better.

System	Star Rating[A]	Overall Score	Desktop Publishing	Illustration	Software RIP	Basic System Price	Phone
Editors' Choice							
Power Computing PowerTower Pro 225	★★★★/7.9	1.5	1.6	1.4	1.3	$4995	512/388-6868
Umax Computer SuperMac S900L 604/200	★★★★/7.8	1.3	1.3	1.3	1.2	$3995	510/226-6886
Apple Power Macintosh 9500/200	★★★/6.6	1.3	1.3	1.3	1.2	$4899[B]	408/996-1010
DayStar Digital Genesis MP 360+	★★★★/7.2	1.2	1.5	1.1	1.0	$7814[C]	770/967-2077
DayStar Digital Genesis MP 720+	★★★★/7.4	1.2	1.5	1.1	1.0	$10,714[C]	770/967-2077
Apple Power Macintosh 9500/180MP	★★★★/7.4	1.0	1.1	1.1	1.0	$5699[B]	408/996-1010

[A] Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) [B] Does not include keyboard. [C] Adds cost of RAM, drives, video card, and keyboard.

Behind Our Tests

Macworld Lab measured the time to perform a range of DTP functions in QuarkXPress and Adobe PageMaker; we measured speed for typical illustration tasks in Adobe Illustrator and Macromedia FreeHand. We also tested rasterization speed for a complex PostScript file in imagesetter resolution using novaRIP, a version of Harlequin RIP from Linotype-Hell. All results are shown as times as fast as a Power Mac 9500/150 (Power Mac 9500/150 = 1.0). Products are listed in decreasing order of overall performance.—**Macworld Lab testing supervised by Mark Hurlow and Chris Uiterwijk**

The Fastest Single-Processor Mac Tops the Publishing Field

WHEN YOU EDIT a path or set type on a page, you're working with objects slightly more complex than colored pixels. An individual anchor point, for example, requires about as much data as two 24-bit pixels. But you're also dealing with far fewer of them.

A typical illustration might contain a few thousand points and handles, and you rarely edit more than a few of them at a time. About the most demanding operation you can perform in any desktop design program is turning a page, and even this is less demanding than opening a large image in Photoshop.

As a result, programs like QuarkXPress and Adobe Illustrator aren't obvious candidates for multiprocessor acceleration, just as they aren't directly benefited by huge quantities of RAM. The speed of these programs is primarily dependent on CPU speed and disk speed because they regularly store and retrieve data on disk. So the surest way to speed up electronic publishing applications is to buy the fastest Mac available equipped with a reasonably fast hard drive or, if your budget permits, a disk array.

At the time we completed our testing, the fastest Mac was the PowerTower Pro 225. Other vendors have been hesitant to jump on the 225MHz bandwagon. Neither Apple nor DayStar had any immediate plans to do so, and Umax claimed the next big step for the S900L would be the 250MHz 604e chip, possibly due out as early as the end of the year. In fact, if all goes according to plan, Power Computing and Umax should deliver 250MHz machines around the same time.

Publishing at Top Speed

Thanks to its faster clock speed, the PowerTower Pro 225 consistently outperformed the other models in our speed tests. Printing pages to an imagesetter is largely dependent on the speed of your printer and processor. But the PowerTower Pro showed that it can deliver the pages the quickest. The Power Computing machine took 5 minutes, 21 seconds to rasterize a complex PostScript document in imagesetter resolution, compared with 5 minutes, 54 seconds for the SuperMac S900L 604/200 and a full 6 minutes for the Power Mac 9500/200. The Genesis MP 720+, meanwhile, lagged behind the pack at 7 minutes, 11 seconds.

Most of the other tests showed similar trends, with the PowerTower Pro performing about 10 percent faster, consistent with its enhanced clock speed. But if you spend much time applying special effects in Illustrator or Macromedia FreeHand, the PowerTower Pro looks even better. We were able to apply the 3D Transform filter from MetaTools' KPT Vector Effects in 6 seconds on the Power Tower Pro 225, versus 9 seconds on the Power Mac 9500/200 and 10 seconds on the S900L 604/200. Other Vector Effects filters zipped along at equally accelerated rates.

You can lay these 50 percent speed boosts at the feet of the PowerTower Pro's increased cache, a full megabyte compared with 512K in other machines. The increased cache (which you can upgrade in the 9500/200 or S900L 604/200 for about $100) helps when you're creating 3-D logos and other object-oriented embellishments.

Video and Disk Speed

As impressive as the speed results may be, our recommendations for the PowerTower 225 stem from more than the clock speed. Publishing professionals are forever required to keep up with the newest and highest-capacity media. You never know what your next client is going to walk in with, particularly if you work in a service-bureau environment.

If storage is a continual challenge for you, then you're going to absolutely eat up this machine. The PowerTower is outfitted with more drive bays than any Mac except the Genesis MP, including an unparalleled six bays up front (not including the floppy!). Imagine being able to insert any variety of removable media—whether a SyQuest, MO, Zip, or Jaz cartridge—right into the front of your machine. Most electronic publishers would give their eyeteeth to forgo the seemingly relentless termination problems and desktop clutter associated with five or six different removable-media devices, and Power Computing finally gives you the chance to do so.

For those of you with two-page monitors who are wondering what to do with your old NuBus graphics cards, you can stop worrying. Every PowerTower Pro model includes an IMS Twin Turbo video card with 8MB of VRAM as standard equipment. The card provides QuickDraw acceleration, so you can scroll just as fast as you're used to. But the best news is that you get 24-bit color at resolutions as high as 1600 by 1200 pixels. This means you can see an entire two-page spread at 150 percent magnification. Power Computing seems to be well aware of its audience.

Married to the Mac

The PowerTower Pro 225's features suggest that the Mac will remain the best platform for one of its core audiences, electronic publishers. Power Computing was the first manufacturer out the door with a 225MHz machine, Mac or PC. Add its stalwart collection of standard-issue advantages—high-res video, plentiful bays up front, and a generous supply of cache—and you've got the ultimate page-designing machine.

Best imaging machine you can buy: The DayStar Genesis MP 720+.

Ultimate Imaging and 3-D Graphics

Best result in test. Longer bars are better.

System	Star Rating[A]	Overall Score	Photoshop Color Balance/ Adjustment	Photoshop Gradient/ Rotations/ Sizings	Photoshop Filter Operations	3-D Render	Basic System Price	Phone
Editors' Choice DayStar Digital Genesis MP 720+	★★★★/7.4	2.2	1.6	2.5	2.6	2.0	$10,714[B]	770/967-2077
DayStar Digital Genesis MP 360+	★★★★/7.2	1.7	1.4	2.0	2.0	1.5	$7814[B]	770/967-2077
Apple Power Macintosh 9500/180MP	★★★★/7.4	1.7	1.4	1.9	2.0	1.6	$5699[C]	408/996-1010
Power Computing PowerTower Pro 225	★★★★/7.9	1.4	1.3	1.5	1.4	1.6	$4995	512/388-6868
Umax Computer SuperMac S900L 604/200	★★★★/7.8	1.4	1.2	1.4	1.3	1.5	$3995	510/226-6886
Apple Power Macintosh 9500/200	★★★/6.6	1.3	1.2	1.4	1.3	1.5	$4899[C]	408/996-1010

[A] *Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.)* [B] *Adds cost of RAM, drives, video card, and keyboard.* [C] *Does not include keyboard.*

Behind Our Tests Macworld Lab ran more than 40 different operations in Adobe Photoshop, plus render tests in the most popular 3-D modelers—Strata's Studio Pro Blitz, which is multiprocessor aware; Specular International's Infini-D; and Ray Dream's Ray Dream Designer. Each test machine used 128MB of RAM. All results are shown as times as fast as a Power Mac 9500/150 (Power Mac 9500/150 = 1.0). Products are listed in decreasing order of overall performance.—**Macworld Lab testing supervised by Mark Hurlow and Chris Uiterwijk**

Look to Multiprocessing for Peak Imaging Performance

YOU WOULDN'T think something as small as a pixel could cause such problems. One little colored speck on the screen—a scant 3 bytes of data—hardly seems much of a reason for concern. It's just that there are so many of them. The smallest image you download off the World Wide Web contains more pixels than there are cars on your rush-hour journey home, and a 72MB Pro Photo CD image contains nearly as many pixels as there are people in all of California. Managing these hordes sometimes seems as grand an effort as governing a large city. Worse yet, images mutate and present new challenges every time you choose the Open command.

In that light, it's little surprise that the fastest imaging machine boasts the biggest supply of CPUs. DayStar's Genesis MP 720+ includes four 180MHz 604e processors on board. Not coincidentally, the MP 720+ is by far the most expensive machine we reviewed, at $8499 for even the most basic configuration, which does not include RAM, hard drives, or a video card. But if computer imaging is your bread and butter, the Genesis MP delivers speed savings that single- and dual-chip systems can't match.

Applications have to be specially rewritten to take advantage of multiprocessor acceleration (see the sidebar, "The State of Macintosh Multiprocessing: A Mac That's as Fast as You Are"). And the most significantly revised application thus far seems to be Adobe Photoshop. As this article developed, DayStar regularly shipped us newly accelerated plug-ins so that Photoshop actually grew speedier from one week to the next. To other system vendors, Photoshop may be just another application. On a Genesis MP, the application becomes a work in progress. (Keep an eye out for accelerated versions of Deneba's Canvas and Fractal Design Painter soon.)

Double-Speed Photoshop

This makes it hard to pinpoint an exact time savings for Photoshop. Some operations absolutely flew. A Gaussian Blur adjustment that took more than 90 seconds to complete on the PowerTower Pro 225 came in under 21 seconds on the MP 720+. Meanwhile, a CMYK mode conversion that took a little over 5 seconds on the single-processor machines finished in 2.4 seconds on the MP 720+. All in all, you can expect most operations to hum along twice as fast on a four-chip Genesis MP as they would on even the fastest single-CPU Mac.

3-D Rendering

The flip side of professional imaging is three-dimensional rendering, which converts models and lighting effects into photo-realistic image files. At press time, we were able to test just one MP-accelerated 3-D draw program, Strata StudioPro Blitz. And while the Genesis MP 720+ clocked in measurably faster than its competitors, the time savings did not exactly rock our world. An image that took little more than 4 minutes to render on the PowerTower Pro 225 took less than 2½ minutes to render on the MP 720+. Every little time savings helps, but you'll still spend a lot of time switching computers when working in 3-D.

Many more 3-D programs have promised MP support in 1997, including Specular International's Infini-D, Ray Dream Designer, and ElectricImage Animation System. And though Live Picture is not a 3-D program, its rendering engine—which behaves very much like a 3-D renderer—is slated for MP acceleration as well. Apple has also built MP acceleration into QuickDraw 3D. But for now, unless you use StudioPro Blitz routinely, 3-D multiprocessing is still in the future.

You Gotta Have RAM

Photoshop presents the most compelling case for making the jump to MP—and yet our findings are not without caveats. While Macworld Lab performed all published tests on a 15MB image with 100MB assigned to Photoshop, our unofficial tests showed that increasing the image size or decreasing the RAM partition resulted in less substantial acceleration. DayStar agrees that a heaping helping of RAM still ranks as the number one way to accelerate Photoshop. If you routinely work on 50MB images and your Mac is equipped with just 60MB of RAM, then allotting $1000 on an aggressive RAM upgrade is going to buy you the biggest speed enhancement for your buck. Only if you have more than enough RAM to satisfy Photoshop's gluttonous appetite should you resort to MP.

And while the Genesis MP 720+ has much to recommend it, buyers with limited funds should consider dual-CPU solutions from DayStar, Apple, and Umax, which supply much of the speed savings, and a heck of a lot less burden on the pocketbook. The Power Mac 9500/180MP performed extremely well in our tests, ranking a solid second behind the Genesis MP 720+. And at press time the 9500/180MP was priced several thousand dollars less than a similarly equipped 720+, and less than $1000 more than the PowerTower Pro 225.

But if money is no object, and you'd like for once to own a machine you can grow into, the Genesis MP 720+ reigns supreme—for now. Around the time this appears, a 200MHz version of the Genesis MP—the 800+—should be available. Our spot tests of Photoshop running on a prototype 800+ suggest a 10 percent improvement over today's champion.

DayStar's Genesis MP 720+ offers the fastest media authoring money can buy.

MW LAB Ultimate Multimedia Authoring and Digital Video

Best result in test. Longer bars are better.

System	Star Rating [A]	Overall	Digital Video—After Effects	Digital Video—Premiere	Sound Editing	Basic System Price	Phone
Editors' Choice DayStar Digital Genesis MP 720+	★★★★/7.4	1.7	2.7	1.2	1.2	$10,714 [B]	770/967-2077
DayStar Digital Genesis MP 360+	★★★★/7.2	1.4	1.9	1.2	1.2	$7814 [B]	770/967-2077
Power Computing PowerTower Pro 225	★★★★/7.9	1.4	1.4	1.3	1.5	$4995	512/388-6868
Apple Power Macintosh 9500/180MP	★★★★/7.4	1.4	1.9	1.1	1.1	$5699 [C]	408/996-1010
Umax Computer SuperMac S900L 604/200	★★★★/7.8	1.3	1.3	1.2	1.3	$3995	510/226-6886
Apple Power Macintosh 9500/200	★★★/6.6	1.3	1.3	1.2	1.3	$4899 [C]	408/996-1010

[A] *Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See* Star Ratings *section for full explanation.)* [B] *Adds cost of RAM, drives, video card, and keyboard.* [C] *Does not include keyboard.*

Behind Our Tests

Macworld Lab used the two most popular desktop video packages—Adobe After Effects and Adobe Premiere—to measure performance in assembling and compressing a multilayer movie with many special effects.

For sound-editing performance, we used Macromedia SoundEdit to downsample a soundtrack and apply a reverb effect to that clip. All results are shown as times as fast as a Power Mac 9500/150 (Power Mac 9500/150 = 1.0). Products are listed in decreasing order of overall performance. **—Macworld Lab testing supervised by Mark Hurlow and Chris Uiterwijk**

Multimedia Authoring and Digital Video

Multiprocessing Rises to the Top for Professional Authors Managing Diverse Media

DIGITAL VIDEO applications make the trials and tribulations of working in Photoshop look downright tame. Even when recording and playing back quarter-screen frames at modest frame rates, your computer has to process millions of pixels per second. If Photoshop hangs for a second or two when opening a Photo CD image—roughly the same amount of data—it's no biggie. If anything comparable happens in Adobe After Effects, it constitutes a minor disaster. And when you're working with full-size frames at 60 fields per second, the stakes become even higher. That kind of data pushes personal computing technology to its absolute limit.

As with imaging, we're talking about an intensive procedure that can benefit from the combined efforts of multiple processors tackling the job in unison. And again, the best computer for the job is the one with the most and the fastest CPUs, the Genesis MP 720+. (Macworld Lab tested a prototype of the 800+, which will be added to DayStar's lineup around the time this appears. For digital video, it outperforms the 720+ by 7 percent.)

Possibly more important, the Genesis is the only box large enough to accommodate an internal disk array. With third-party video-input hardware, the disk array permits you to record and play movies in real time.

Internal Drive Capacity

The Genesis includes a total of nine drive bays (not counting the floppy drive). Only two bays offer front-panel access—both 5.25-inches—and one of these is consumed by the CD-ROM drive. I'm not sure whether this is the best general-purpose design—I might prefer a few more forward drive bays for Jaz drives and the like—but for DayStar, removable media is obviously a secondary concern.

The primary concern is hard drive capacity. The case permits a whopping seven 3.5-inch internal drives, all of which you can access with complete ease by removing the side panel. The drives load sideways, which gives you an idea of just how wide this machine is. DayStar sells a $2599 4GB two-channel disk array that fits snugly into the internal bays.

The advantage of an internal array is that you can achieve fast SCSI-2 transfer rates without installing additional hardware. Just plug the drive into the internal SCSI bus. You can always switch the CD-ROM drive to the internal/external bus (accessible from inside or outside the machine). (Even with an 8× CD-ROM drive, the switch won't slow it down.) DayStar claims the array has read and write speeds of better than 30MB per second, clearly adequate for recording and playing full-NTSC video to disk. (Macworld Lab did not test peripherals for this story.)

After Effects and Premiere

Multiprocessing currently has no effect on video recording. There isn't time enough to allocate the task to different CPUs, and besides, the CPU doesn't really have all that much to do; the video hardware digitizes frames while the computer writes the frames to disk. After you get the movies on disk, the real work begins, and this is where multiple CPUs can help out. A machine like the Genesis MP 720+ helps bring editing tasks up to a reasonable speed, enough to prove interesting to CD-ROM and Internet media producers, and all but imperative to digital video editors.

The Genesis MP 720+ took 1 hour and 22 minutes to assemble and compress a movie in Adobe After Effects 3.1, compared with 2 hours and 35 minutes on the PowerTower Pro 225 and nearly 3 hours on the Power Mac 9500/200 and SuperMac S900L 604/200.

It's still a slow process, but it's the difference between a job you can do during a long lunch and something that'll have to wait until that evening. Adobe Premiere is also MP-compliant, but Adobe's MP changes were minimal, merely allowing the Genesis machines to compensate for the MP overhead.

The Big Sound of MP

If you plan to use the Genesis MP on location, definitely check out a floor model before you make any purchasing decision. This was easily the noisiest machine we tested. It's equipped with the largest power supply—big enough to power an internal array and seven bays of hard drives—and an MP board that practically burns your fingers when you touch it, so the Genesis fans have to work overtime.

Otherwise, your ultimate buying decision again comes down to a matter of money. If you're inclined to stick with the basic Genesis design because of the internal disk array, you may want to think about purchasing a slower model. Even with a relatively small (2GB) hard drive and limited RAM (16MB), a Genesis MP 720+ costs $10,714—a small fortune. You do have cheaper, dual-CPU options: DayStar's $7814 MP 360+ and Apple's $5699 Power Mac 9500/180MP. Going from four CPUs to two does not halve your performance; a two-CPU system is about 70 to 80 percent as fast as a four-CPU system.

Umax's SuperMac S900L series: Super bargain for a Web server.

MW LAB Ultimate Internet Content Delivery

System	Star Rating[A]	Connections per Second	Average Response Time (in seconds)	Simultaneous Clients Supported	Basic System Price	Phone
Apple Power Macintosh 9500/200	★★★/6.6	10.4	6.2	64.7	$4899[B]	408/996-1010
Power Computing PowerTower Pro 180	★★★★/7.6	9.5	7.2	67.6	$4195	512/388-6868
Editors' Choice Umax Computer SuperMac S900L 604/150	★★★/6.9	9.5	7.1	67.2	$3495	510/226-6886

[A] *Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See* Star Ratings *section for full explanation.)* [B] *Does not include keyboard.*

Behind Our Tests

Macworld Lab measured server performance by simulating 100 simultaneous client requests, then measuring the number of connections each server could establish per second, the average response time to a request, and the number of clients that the server could support without turning away clients. None of the tested servers are able to keep a T1 circuit saturated, though all come within 20 percent of saturation. We simulated the network using a 167MHz Sun UltraSparc workstation running Solaris 2.5 and Silicon Graphics' WebStone 2.0.1. The Macs used Quarterdeck/StarNine's WebStar 1.2.5 running under Open Transport 1.1, with virtual memory disabled. Data for the Apple 9500/200 should be slightly faster than what is shown here; those data were derived from the 9500/150, discontinued shortly before this article went to press.—**Macworld Lab testing supervised by Roy Moline**

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Internet Content Delivery

For Delivering the Goods Online, We Chose a High-Performance Bargain

ALTHOUGH UNIX machines continue to dominate for high-volume serving, and very likely will for a while to come, our tests show that a Mac can handle about 100 simultaneous clients, enough to satisfy the requirements of a moderately busy Web site for a small or medium-size business. So if you don't relish spending a month poring through your copy of *Unix for Dummies* to put your site on an ISP's Web server, a Mac-based server may be the ideal solution.

For this category, we tested a Power Macintosh 9500/150, a PowerTower 180, and a SuperMac S900L 604/150. Although these are different models than we tested for the other categories—a reflection of our extended Web-testing protocol—all three are merely slower versions of the units tested in the other categories. And because the only major difference between the faster and slower units is the updated CPU card, our conclusions are applicable to the faster models.

We left the MP machines out of the testing cycle because, according to DayStar and others, MP is currently no help where online content delivery is concerned—so why spend more money than you need to?

The Net-ty Gritty Details

To perform our tests, we equipped all machines with WebStar 1.2.5, from Quarterdeck's StarNine division. We also used Open Transport 1.1, Apple's Power Mac–native networking protocol, created as a replacement for MacTCP. Macworld Lab created an isolated 10BaseT network between each Mac and a Sun 167MHz UltraSparc using Solaris 2.5. Then we put the WebStone benchmark software to work simulating an active throng of hungry surfers invading our immensely popular Web site. (I wish my site got this many hits.)

The Power Mac fared best in our tests, consistently handling an average of slightly better than 10 connections per second—with 100 requesting clients—before the server error rate climbed sufficiently high to indicate that some requests were being dropped. The similarly equipped S900L and slightly faster PowerTower approached 10 connections per second with a 100-client load (both machines tested as high as 9.97), but they never quite reached it, and their averages were 9.5. The Power Mac was also the most responsive when bogged down by 100 clients, taking an average of about 6 seconds to respond when the other machines took closer to 7.

These are minor differences that do not reflect a clear advantage of one model. The variances in our tests probably result from a limitation of the Macintosh Operating System, due to its lack of fully preemptive process switching and the instability of Open Transport 1.1.

WebStone also tracks a variable known as Little's Load Factor that corresponds to the number of simultaneous connections handled by the server. The variable reports the amount of time the server spends transacting with clients as opposed to dealing with errors and managerial tasks that don't directly benefit your visitors. If this value peaks at a certain number, then the server is turning additional users away. All three machines peaked at about 65 simultaneous connections, showing them to be evenly matched.

Is the Best Much Better?

Our tests show that the Power Macintosh 9500/150 had a slight edge over the other machines. But the differences were too minor to warrant our ultimate recommendation. No visitor to your Web site would be able to tell what kind of Mac you were using. They all permit a generally uniform level of activity, keeping a standard T1 circuit about 80 percent utilized. And newer, faster machines are likely to perform only marginally better.

Therefore, you should purchase your next Web server with a long-term outlook. After all, the Web server you buy tomorrow will probably be ripe for replacement in a couple of years. And when that time arrives, the old server will have to be rotated into use. Which of these computers would you prefer to have on your desk two or three years down the line?

In that light, the Power Macintosh 9500 doesn't look so rosy. It's a fine machine, but the internal design is cumbersome, requiring you to disconnect all internal cables and physically remove the logic board from its case just to add RAM. Both the SuperMac S900L and the PowerTower feature more user-friendly designs. In this light, I lean toward the bargain-priced SuperMac. With a faster processor and an ample supply of storage bays, it's the kind of computer you can rely on for years to come, which is why it's our choice for Internet content delivery.

Mac versus Unix

When will any Mac be a credible contender against Unix and Windows NT servers for high-volume Web sites? Too soon to tell. But as it is, a Macintosh Web server can easily service the bandwidth of a typical ISP's 1.544-MBps T1 connection. Combined with its superior ease of use (including remote maintenance) and reliability, this makes the Mac a great choice for midrange Web sites.

You'll also see performance improve significantly in the near future as Apple tunes up Open Transport. Quarterdeck/StarNine reports significant performance improvements under Open Transport 1.1.1 and WebStar 1.3.1, which were available in beta versions at press time.

The State of Macintosh Multiprocessing: A Mac That's

MOST OVERBOOKED media professionals accelerate the old-fashioned way—they use more than one machine. After you begin rendering a 3-D image on your Power Mac, you switch to the old Quadra. When the Quadra gets tied up filtering a 300MB Photoshop image, you move over to your Windows box. Despite years of speed improvements, one person can still keep multiple machines crunching away with relatively modest effort.

The promise of multiprocessing is a machine that's as fast as you are. You can concentrate on one job at a time because you're never left twiddling your thumbs or mulling over your E-mail while a computation-intensive operation completes. Multiprocessing machines aren't that fast yet—you still have plenty of time to deride your computer's feeble attempts to keep up with your lightning-fast demands—but the potential is enormous.

The Birth of the MP Mac Credit DayStar Digital for real innovation. By offering multiple CPU chips on a single board, DayStar has distinguished itself as the first clone vendor to advance Macintosh computing fundamentally. DayStar modeled its nPower multiprocessing architecture—now the Apple Multiprocessor API—on Microsoft Windows NT. This permits vendors who already support multiprocessing for Windows NT to port their code to multiple-CPU Macs. Adobe was able to turn around an MP-aware version of Photoshop 3.0.5, for example, in less than two weeks.

But despite Multiprocessor API's structural similarities to Windows NT, the two are by no means identical. Like Unix and OS/2, Windows NT provides symmetric multiprocessing (SMP), a free-form scenario in which no CPU chip is master and none is slave. Any application, including the operating system itself, can run on any processor. An application can carve a complex operation into as many tasks as there are processors. Or it can run in the background on one chip without degrading the performance of a foreground application running on another chip.

SMP is the ultimate professional computing solution, but it requires a complete overhaul of the operating system. Limited to a handful of system extensions, DayStar's API is hardly sufficient to pull it off. So we have instead what DayStar calls pseudo SMP and what at least one Apple official has called asymmetric multiprocessing (AMP). Under AMP, one chip is the master and the others are slaves. All operations pass through the master chip, which carves up operations and parcels them out. Few operations are complex enough to justify parceling, so the slaves mostly loaf about on their silicon rumps.

Actually, DayStar's multiprocessor API is an improvement over AMP, which explains DayStar's preference for the term *pseudo*. One CPU chip is the primary processor; the others are auxiliary processors. While the operating system and low-level application functions (so-called toolbox calls) have to run on the primary CPU, it can send other operations to the auxiliary CPUs.

For example, Photoshop can query the system to find out how many chips are on board. When the count returns with, say, four CPUs, Photoshop can then divide the operation into an equivalent number of tasks and distribute a task to each processor. Each task finishes in one-quarter the time it would have taken to process the entire operation on one chip. The completed operation takes more than one-quarter as long—maybe even more than half as long—because of the time required to manage the tasks. But there are fewer bottlenecks than would occur with straight AMP.

Multiprocessing Scenarios Under DayStar's API, there are two possible multiprocessing scenarios. The first, which DayStar calls Level 1, is multitasking. An application can exile a long operation—such as rendering a few frames of 3-D animation—to an auxiliary processor. This permits other programs to run uninterrupted in the foreground using the remaining CPUs. So far, no developer shows signs of working in the Level 1 direction. And under the current Macintosh OS, the most obvious candidate for Level 1—background printing—must run on the primary CPU.

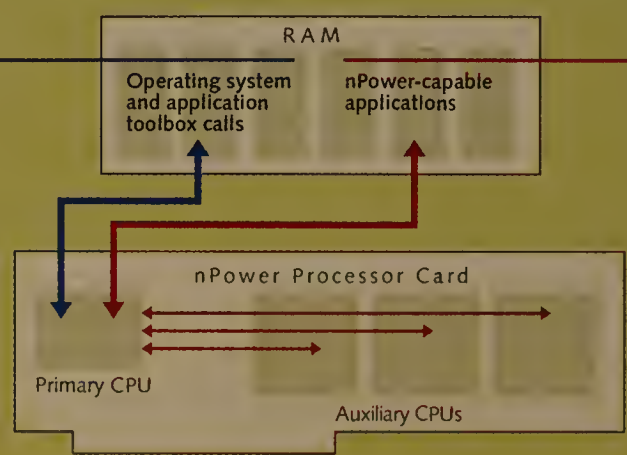
Level 2 is the accelerated single-tasking scenario. An MP-accelerated application divides just about every major operation evenly between the available processors. You still get significant interference when you try to run an intensive operation in the background, just as you do on a

DayStar set a new performance standard with its dual-processor (top) and quad-processor CPU cards.

How nPower Manages Limited Multiprocessing

The Mac OS does not support multiprocessing that divides OS tasks or typical applications among two or more CPUs. But DayStar's nPower MP scheme allows partial multiprocessing by distributing the tasks of specially written applications, such as Adobe Photoshop, among two or four CPUs. This yields stunning performance on those applications, but no benefit (or even a slight slowdown due to the scheme's overhead) on other applications.

The primary CPU handles Mac OS tasks and toolbox calls, and runs all applications. It also parcels out portions of MP-enabled tasks to the auxiliary CPUs.



Specially written applications access the auxiliary CPUs through the primary CPU. Communications overhead between the CPUs is more than compensated for by the MP speed boost.

single-CPU machine. But the interference takes less time to clear up. And because each operation finishes in a shorter amount of time, you are theoretically less inclined to switch applications.

Clock Speed Still Matters So far, MP boards are lagging slightly behind their single-chip counterparts in the speed department. As I write this, the fastest clock speed of a shipping Macintosh is 225MHz, while the fastest MP machine runs at 180MHz. Which machine is best for you depends on what kind of operations you perform and the magnitude of those operations.

Imagine for a moment that the CPUs are horses. You have a squad of four horses, each of which can go 25 miles per hour, racing against a single horse that can go 30. The winner depends on the load. Harness each team to a small cart with a monkey in it, and the single, faster horse wins. But tie each team to a stagecoach full of gorillas, and the slower, more powerful squad of four horses wins the race.

If you spend most of your time previewing illustrations in Macromedia FreeHand or changing pages in QuarkXPress, you're asking your horses to pull around lots of little loads. As a result, single-CPU processing is sufficient, and both applications will run at the highest speeds on the fastest CPU available. But if you spend your days changing color modes and correcting photographs, the load grows heavy enough to benefit from the bulk power of multiple CPUs. And when you render effects out to frames and apply complex image distortions, your gorilla count goes through the stagecoach roof.

MP's Bright Future Given the expense of MP machines, consider the immediate return carefully. With four CPUs on board, our tests show, the average MP-aware applications such as Photoshop deliver on average about twice the speed of the fastest single-processor machines, and even that assumes you have enough RAM to avoid hitting disk. (Bear in mind that some operations within an MP-aware application, such as a large-radius Gaussian Blur in Photoshop, run at nearly seven times the rate of the same functions on single-processor Macs. Other functions realize no speedup.) Such modest time savings justify the price for large-scale media providers, but independent producers and freelance artists may expect better.

However, project a year into the future, and things get rosier. The lesson of the Power Mac teaches us that the investment you make in new technology today will appreciate as accelerated software becomes better optimized and more plentiful. The list of major applications and support utilities that plan to support MP in 1997 reads like the ultimate media software library. And if Apple does equip the next version of the system software with SMP, as promised, tomorrow's OS-level operations will run on today's multiple CPUs.

DayStar currently has exclusive rights to sell four-chip machines, with Apple and other vendors limited to two-chip solutions (as in the case of the Power Mac 9500/180MP). But that arrangement ends in April 1997, according to Apple. After that point, any vendor can slap as many chips on a CPU board as it pleases, and although no vendor except DayStar has announced plans to go beyond two chips, it seems reasonable to expect a more competitive market by this time next year. For those of you who already have PCI machines, Apple tells us that all 8500's and 9500's are technically MP ready. You can expect to see two-chip upgrade boards for existing machines early next year.

CONTINUED FROM PAGE 121 one exception—by far the best challenge to Web servers was a simulation of Web traffic.) We tore the machines apart, put them back together, and spent some quality time cursing at them.

Modern Machinations

All five towers are based on Apple's 9500 logic board, which supplies six PCI slots (no NuBus), 128-bit interleaved memory, two SCSI buses (one Fast 10-MBps internal bus, and one 5-MBps internal/external bus), and an industry-standard 10BaseT Ethernet port. The Power Mac 9500 and Genesis MP offer 12 RAM slots; you can expand the latter to 1.5GB using 128MB DIMMs; both units expand to 768MB of RAM with 64MB DIMMs. The PowerTower Pro and S900L top out at 1GB, with 8 DIMM slots. Most of the machines include a single GPU slot to facilitate processor upgrades. The S900L offers two CPU slots, but for now, the extra slot goes unused. Umax hopes to offer secondary-slot CPU cards by year's end.

The computers we tested also share a reliance on the 604e chip, which theoretically permits clock speeds of 250MHz and higher. This pushes the processor-to-bus speed ratios (as high as 5:1) to their maximum, since the 9500 CPU bus speed is limited to a mere 50MHz. (Apple plans to increase bus speed to 66MHz next year.)

The Last Word

These powerhouse machines demand a huge investment. The DayStar Genesis MP series sets a new record for the amount of cash you can spend on a Mac. But if you're well established in your field, a few weeks of additional productivity over the course of a year easily justify a $10,000 entry fee.

We likewise sat up and took notice of the speed and stability of the fastest single-CPU Mac, the PowerTower Pro 225, our suggestion for the best electronic publishing machine. And while an Apple product performed marginally better in our Web server tests, Umax's bargain-priced SuperMac S900L 604/150 makes a better choice. Overall, the Mac has leaped ahead in the last few months. Normally we try to maintain a cool analytic composure in Macworld Lab, but this time our last word really is just one word: Wahoo! **m**

Contributing editor DEKE McCLELLAND wrote the upcoming *Macworld Photoshop 4 Bible* and *PageMill 2 for Dummies* (both IDG Books Worldwide, 1997). Additional reporting by contributing editor MEL BECKMAN.

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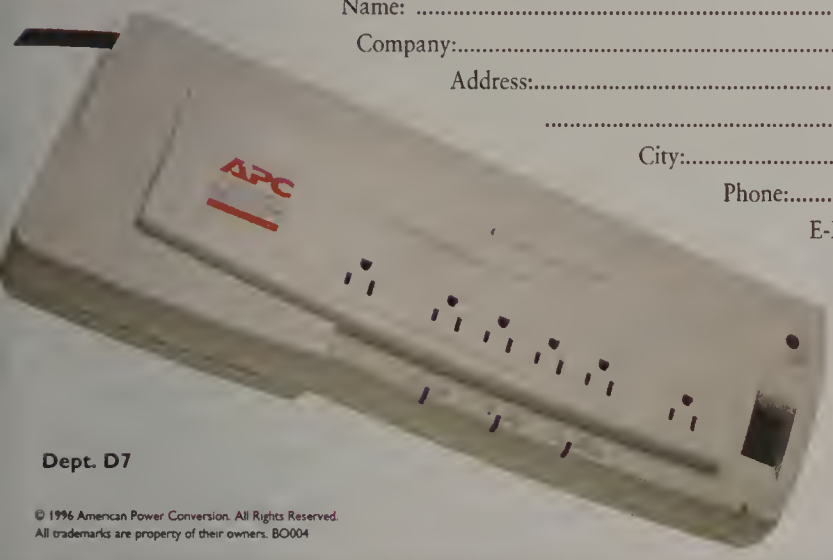

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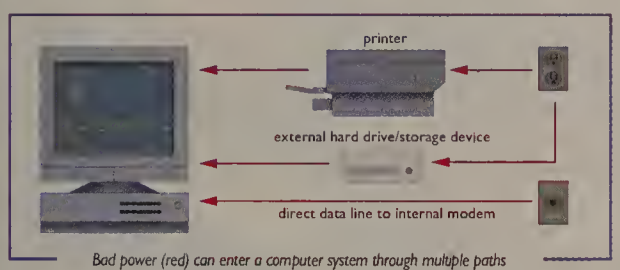
Back-UPS Office provides reliable power for your entire system. Instantaneous battery backup ensures uninterrupted operation of your Mac, monitor and an external storage device. Full-time surge suppression and site-wiring fault protection spreads a true Multipath safety net under any remaining integrated peripherals, like modems, printers, faxes and phone systems. Back-UPS Office also provides convenient BlockSafe™ outlet spacing to handle all size plugs – even large block transformers.

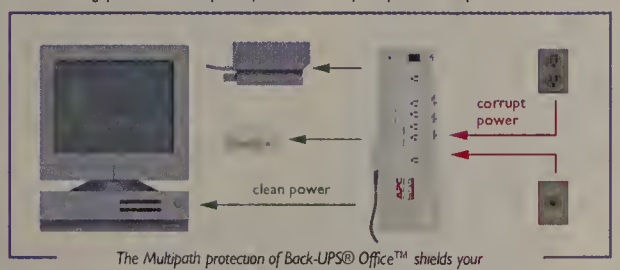
Unique Multipath protection keeps your Mac safe

Plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your AC powerline is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive Mac.

MULTIPATH MEANS TOTAL POWER PROTECTION



Bad power (red) can enter a computer system through multiple paths – eg. printer, data and phone/fax lines – even if computer A/C is protected.



The Multipath protection of Back-UPS® Office™ shields your peripherals and guards your computer from bad power on every path, providing clean, safe power (green), to your entire system.

Multiple peripherals and data lines to and from your system are vital, but dangerous. Without them, you can't do your job. However, if a power sag makes your modem drop the line while you're downloading from the Internet, or locks your keyboard before you've saved work, you lose time, money and spend another late night at the office to meet your deadline.

Back-UPS Office: a safe place to plug everything

Until now, protection for your entire system required several devices. But multi-device protection can leave you vulnerable to line noise and unwanted data glitches created by the voltage differential between outlets. Those glitches are prevented with the Back-UPS Office common voltage reference.

Back-UPS Office means true Multipath protection, clean, safe power to every peripheral, and instant battery backup to keep your cutting edge system and O/S from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, with protection guaranteed up to $25,000.

Only Back-UPS Office provides single device Multipath protection for all your equipment

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Phone			•
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Number of Block Outlets			2
Protection from			
Surges	•	•	•
Spikes	•	•	•
Blackouts		•	•
Brownouts		•	•
Overvoltages			•
Typical Runtime in Minutes			
with Pentium 100 w/15" monitor		10	10
Battery backup for			
PC		•	•
Monitor		•	•
Storage Devices/Zip Drives			•
Full-time surge protection for			
Fax/Modem	•		•
Laser Printer	•		•
Speakers	•		•
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Traditionally, protecting all your peripherals meant having to buy a surge suppressor and a UPS. Even then, only the AC line was protected. Back-UPS Office protects all paths: Bulletproof Multipath protection.

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The Year's 10 Best CDs

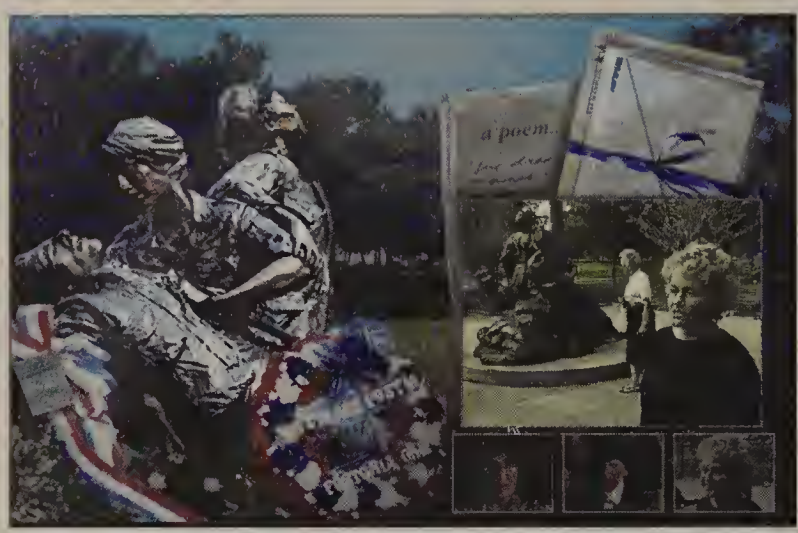
These top-notch titles will transport you to new places and link you to the latest online resources

Any minute now, the World Wide Web, with its links to a vast amount of up-to-the-minute information, is going to transform the interactive CD-ROM into the nineties equivalent of an eight-track tape. ¶ At least, that's what some industry analysts predict. But I'm here to report that the CD is very much alive, thank you, and doing better than ever. The current batch of multimedia CDs are, on the whole, more sophisticated technically than last year's titles—or anything on the Web, for that matter. Using virtual reality and 3-D environments, a number of current CDs transport you to places you'd never be able to visit otherwise—for instance, the Los Alamos National Laboratory, the birthplace of the atomic bomb, during World War II. Or the *Apollo 13* space capsule during its aborted moon mission in 1970.

As for the Web clobbering the CD, many developers are combining the best of both technologies. Companies such as Microsoft and Maris Multimedia are posting updates to their CD titles on the Web. Once you download and store the data in the appropriate folder on your hard drive, the CD can access it and integrate the updates into the CD's content (for example, every month Microsoft posts new movie reviews for Cinemania).

If that weren't enough, a new generation of CD titles based on the high storage capacity of the Digital Versatile Disc (DVD) format is just around the corner. DVD-ROMs enable developers to create interactive programs with vastly richer multimedia content—say, an encyclopedia with hours of full-screen video clips—than ever before.

by James A. Martin



Beyond the Wall Although its primary focus is on the Vietnam War and the construction of the Vietnam Veterans Memorial in Washington, D.C., Beyond the Wall also includes a touching section on the Vietnam Womens' Memorial.

Critical Mass With Critical Mass, you can take a virtual tour of the Los Alamos National Laboratory in New Mexico as it was during World War II. Click on any yellow "i" icon for more information about a particular building.

Microsoft Cinemania 97 The new version of Cinemania includes narrated slide shows, called Celebrity Tours, on a variety of topics. In this tour, American Movie Classics' Bob Dorian talks about the art of Alfred Hitchcock.

Not to worry—those shiny discs haven't lost any of their luster. The following ten programs developed specifically for CD-ROM (excluding shareware, fonts, utilities, and such) are among the best the medium has to offer. Another six titles are celebrated in the sidebar, "Six More Worth a Look." I don't include games, however; I leave that to Steven Levy and his annual tribute, "The Macintosh Game Hall of Fame" (look for the latest inductees in the January 1997 issue of *Macworld*).

HISTORY

Beyond the Wall
★★★★/7.4
Twentieth Century Fox Home Entertainment
310/369-3900,
http://www.tcfhe.com
$29.95 list price

It's difficult for memorials to truly convey the flesh-and-blood stories of the subjects they honor. An effective solution, though, is at hand: create a multimedia CD-ROM about the memorial, as Twentieth Century Fox Home Entertainment has done with the Vietnam Veterans Memorial in Washington, D.C.

With Beyond the Wall, you can learn about the making of the black-granite memorial through video, text, graphics, and audio. There's a section on the Vietnam War, complemented with ample, effectively chosen news footage, essays, and a selection of letters written by soldiers to the folks back home. Many of these letters have a subtle but haunting emotional resonance—such as the one in which a soldier writes to a friend, "When not possible to answer all letters, I'll answer in spirit," not long before he is killed.

The CD's best feature, though, is the ability to visit the memorial via a virtual 3-D environment. As you move along, you'll find objects left behind by mourners—flags, record albums, a teddy bear, a helmet—to explore. You can search for individuals by keywords (for example, last name or hometown); the program then delivers their vital statistics and shows where to find their names in the memorial.

Beyond the Wall has some clunky spots—the navigation controls could be easier to use, for instance, and the images and icons are often too dark. Still, this is an eloquent, emotional testimony to the many people who died in that long, highly controversial war.

Critical Mass: America's Race to Build the Atomic Bomb
★★★★/7.9
Corbis
206/641-4505,
http://www.corbis.com
$49.95 company's estimated price

During World War II, scientists worked feverishly to develop an atomic bomb at the Los Alamos National Laboratory in New Mexico. Now, more than 50 years later, you can easily wander from one formerly secret building at Los Alamos to another, thanks to interactive 3-D graphics.

There's lots to praise in Critical Mass, from the immediacy of its vintage newsreel-like introduction to its thought-provoking biographies, timeline, archival documents, and scientific backgrounds. The interface makes it easy to navigate the content.

The best part of the CD is the virtual exploration of the Los Alamos site. Using a slider bar and a map, you can roam the compound as it appeared during WWII. Background noises—a popular tune from the period, the sounds of machinery operat-

ing—add texture to the experience. Clicking on an information icon in a scene takes you to a brief narrated slide show about that building. Some of these narratives are enhanced with video interviews of people who lived and worked here during wartime—adding a welcome human element to the story. Critical Mass succeeds admirably in delivering the "you are there" experience.

CULTURE

Microsoft Cinemania 97
★★★★/8.0
Microsoft
206/882-8080
http://www.microsoft.com
$34.95 company's estimated price

I love movies; it's the video store I can't abide. If you don't know what video to rent, you've got to browse through 20 trillion titles. And if you do know what you want, chances are that movie's checked out. Then what?

Then you get Cinemania, Microsoft's indispensable multimedia guide to 20,000 films. Using the Cinemania Suggests feature, you can quickly search by mood (such as A Good Laugh) or genre (Camp Classics, Film Noir, and so on). The Special Interests category contains lots of fun subgenres, such as Big Budget Bombs, Alternative Westerns, and movies filmed in San Francisco. Cinemania also offers excellent filtering, enabling you to generate and print a list of, say, four-star Oscar winners available on laser disc—great ammunition for the video store.

The 1997 version features an entertaining, if glitzy, new feature called Celebrity Tours—slide shows of Cinemania's content on various topics, narrated by noted Hollywood insiders. Each month you can download new celebrity tours from Microsoft's Cinemania Web site (or from Microsoft Network), as well as updated film reviews. The downloaded information, which is free, can be integrated into the CD's content on your hard drive. Now, if I could just download the movie I want to watch, too, my video-store agonies would be over forever.

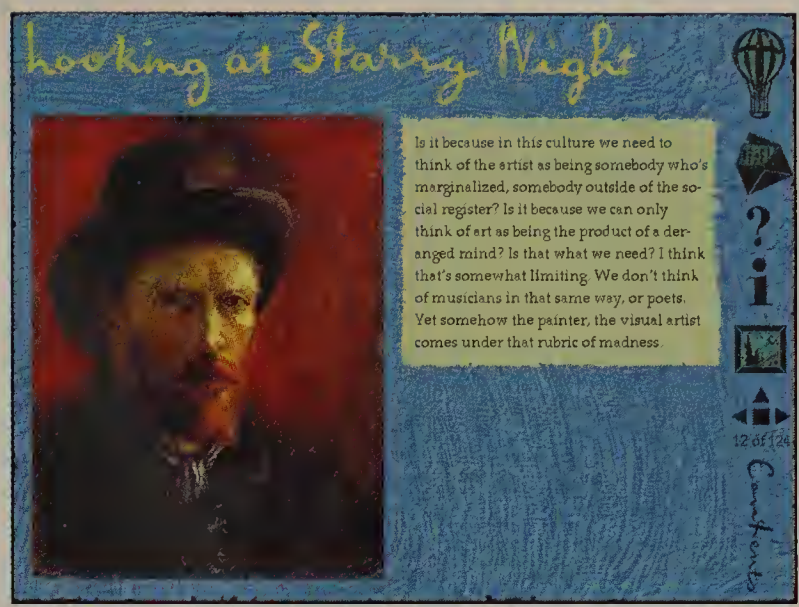
Van Gogh Starry Night
★★★★/8.1
Voyager
212/431-5199,
http://www.voyagerco.com
$39.95 list price

In Van Gogh Starry Night, a multimedia examination of the Dutch postimpressionist's masterwork, historian Art Boime argues compellingly that van Gogh was *not* a raving madman. True, the artist painted *Starry Night* from his window in an asylum. But *Starry Night* is not simply an artistic rendering of a mad artist's angst, as some scholars have contended for years.

Boime reminds us that van Gogh checked *himself* into the asylum. While the artist had fits of depression, he was never more lucid than when painting. Furthermore, the artist possessed a keen, almost scientific mind. He was an astronomy buff, and his depiction of the celestial bodies in *Starry Night* closely matched the astronomical records for June 18 to 19, 1889—the night he painted his masterpiece.

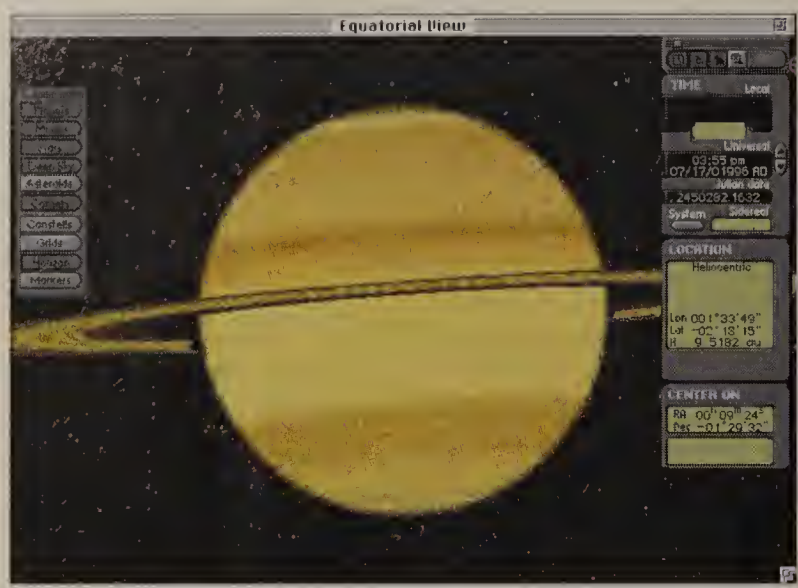
Boime's surprising conclusions are enhanced by limited but well-chosen interactivity. In essence, the program is a narrated slide-show lecture, with links to van Gogh's letters; the text of Boime's lecture; related narratives that explore influences on van Gogh's work; and a full-screen, high-resolution, scrollable reproduction of *Starry Night*.

It's just enough interactivity to make this a worthwhile CD-ROM presentation, but not so much that you're tempted to wander off in various directions, thereby diluting the power of Boime's absorbing narrative. Van Gogh Starry Night quietly makes the point that regardless of all the technological bells and whistles available to developers, sometimes there's nothing more effective than a good story, simply told.

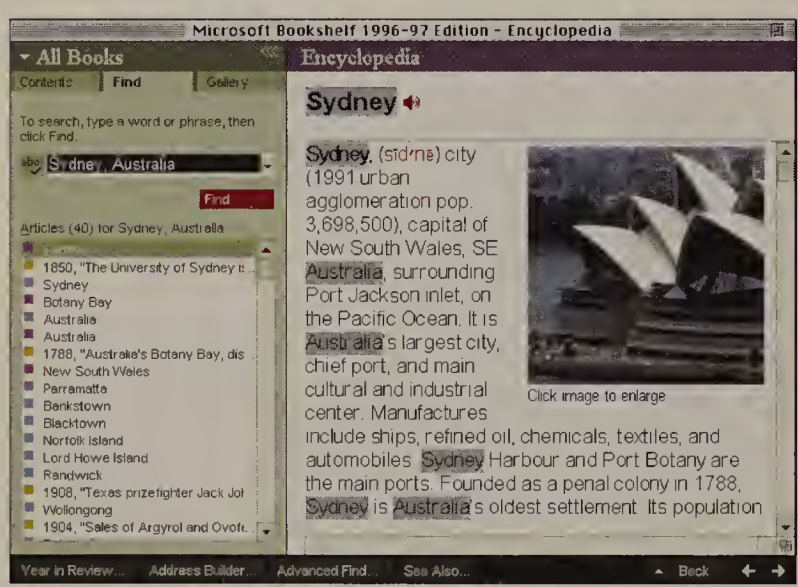


Van Gogh Starry Night The CD-ROM exploration of van Gogh's *Starry Night* includes a number of other paintings by the artist, such as this self-portrait, the option to display the audio narrative's text, and icons (far right) for easy navigation through the program.

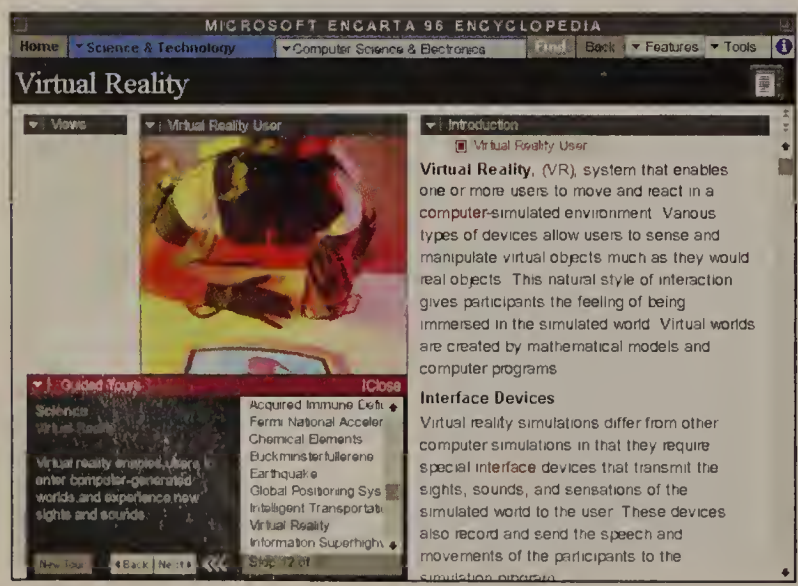
Volcanoes: Life on the Edge Stunning color photographs in slide-show format and vivid narratives make this multimedia exploration of volcanoes explode on the screen.



RedShift 2 Gallop all over the galaxy—exploring the stars, orbiting planets (such as Saturn, pictured here), even hitchhiking a ride on comets, both past and present—with RedShift 2.



Microsoft Bookshelf A single search on *Sydney, Australia,* in Microsoft Bookshelf renders 40 articles from a total of 9 reference works. Each article has a color-coded box at left that designates the reference work in which the article is located. Encyclopedia entries, for instance, have a purple box.



Microsoft Encarta One of the many ways you can explore Encarta is via Guided Tours (see the dialog box, bottom left). The science tour, for instance, includes a look at virtual reality, among other topics.

SCIENCE

Volcanoes: Life on the Edge
★★★★/7.2
Corbis
206/641-4505
http://www.corbis.com
$49.95 company's estimated price

Fans of the summer blockbuster *Twister*; take note: Here's a captivating CD-ROM about a *National Geographic* photographer who chased 9 volcanoes during one of the most volcanically active 14-month periods of the century (in 1991–92).

Volcanoes: Life on the Edge has many of the elements of a fast-paced PBS documentary. Before the credits roll, we hear photojournalist Roger Ressmeyer talking about the upcoming assignment—to travel the globe in search of erupting volcanoes and capture them in vivid photographic detail—and his sense of dread. Meanwhile, photos of Ressmeyer flash on the screen, intercut with captions hammered out by a typewriter, film-noir style. To further accentuate the drama, actress Helen Mirren (noted for the PBS series *Prime Suspect*) is on hand to narrate.

Although there's no video, the CD offers plenty of stunning color photographs, arranged in slide shows and narratives, which run either automatically or manually, allowing you to move at your own pace. There are plenty of fascinating facts—Krakatau's famous blast in 1883 was so loud it struck the locals deaf and could be heard 3000 miles away, for instance, and the world's most devasting volcano, Tambora, was still being blamed for deaths 16 years after it exploded in 1815 in the East Indies. A generously illustrated online dictionary of volcano terms is linked to terms throughout the text. Volcanoes: Life on the Edge can be overmelodramatic at times, and oddly understated at others. But then, you could say the same for volcanoes.

RedShift 2
★★★★/7.5
Maris Multimedia
415/492-2819
http://www.maris.com
$54.95 company's estimated price

I don't like to make assumptions, but I bet you've never crash-landed on Jupiter. Or seen Earth from the window of the *Apollo 13* spacecraft. For that matter, you haven't even ridden a comet. Well, I've done all of the above, thanks to Maris Multimedia's RedShift 2, and I highly recommend the experiences.

With RedShift 2, you'll be jumping from star to star faster than a waiter in a Hollywood restaurant. This interactive sky simulator offers superb animations, film clips, photographs, a wealth of astronomical data, and helpful links to the *Penguin Dictionary of Astronomy*. You can also visit Maris's Web site and download updated data on comets, eclipses, and such, which you can incorporate into the program.

With Space Flight, RedShift's most exciting feature, you can jump aboard the satellite, comet, or spacecraft of your choice. The view you get of Earth, the Sun, or other stars on each of your flights is designed to replicate what you'd experience if you truly were on board.

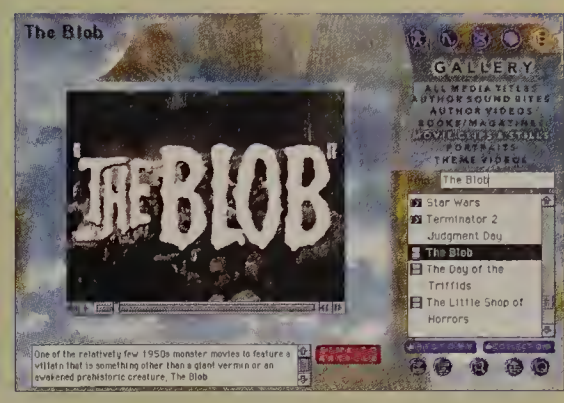
The CD offers a wealth of settings and controls—you can do your stargazing from any planet, at any time, for instance. And you can save your space explorations as a QuickTime movie. The icons and navigational controls can be confusing, however, and if you're not careful, you might end up lost in space. But when you're having this much fun, who cares?

Six More Worth a Look

Here are six runners-up worthy of collecting

Infinity City

Paul Cézanne: Portrait of My World



Grolier Science Fiction

Sheila Rae the Brave
★★★★/7.0
Brøderbund Software
415/382-4400
http://www.broderbund.com
$39.95 list price

She may be a mouse, but Sheila is a brave one—until she gets lost one day and learns what bravery is all about. This latest, engaging entry in the Living Books series adds songs and games to the formula.

Grolier Science Fiction: The Multimedia Encyclopedia of Science Fiction
★★★/6.7
Grolier Interactive
203/797-3530
http://www.grolier.com
$39.95 list price

A fun if somewhat shallow reference guide to sci-fi books, movies, TV shows, and culture.

Infinity City
★★★★/7.0
Headbone Interactive
206/323-0073
http://headbone.com
$29.95 list price

That goofy Gigglebone Gang from Pantsylvania and AlphaBonk Farm are back, this time to help kids learn math skills through various activities. Slightly more educational than Pantsylvania, but not quite as much fun.

Exploring the Lost Maya
★★★★/7.0
Sumeria
415/904-0800
http://www.sumeria.com
$49.95 list price

A well-crafted tour (via QuickTime VR) of Mayan culture and sites in Mexico and Central America. The text and narrations can be a bit dry, though.

Paul Cézanne: Portrait of My World
★★★/6.8
Corbis
206/641-4505
http://www.corbis.com
$49.95 company's estimated price

An interactive tour of the great painter's life and art. Not as well focused as Van Gogh Starry Night, however.

Planet Earth. Explore the Worlds Within
★★★/6.7
Macmillan Digital USA
212/654-8500
http://www.macdigital.com
$49.95 list price

This interactive atlas offers six world maps; large-format videos; slide shows; satellite images; the ability to compare languages; and more. The graphics and interface could use a makeover, however.

REFERENCE

Microsoft Bookshelf 1996–97
★★★★/7.9
Microsoft
206/882-8080
http://www.microsoft.com
$54.95 company's estimated price

No other Mac CD serves up as many top-notch reference resources as Bookshelf. Like previous editions, the 1996–97 Bookshelf contains the entire contents of seven reference books: dictionary, thesaurus, concise encyclopedia, atlas, book of quotations, almanac, and history chronology.

The current Bookshelf includes two more handy references: a five-digit zip-code database and a directory of 5000 World Wide Web, Gopher, and FTP sites. The Internet Directory runs the gamut of topics, from AAA travel tips to Zoroastrianism (a Persian religion). With Microsoft Internet Explorer installed, you can double-click on an URL and go right to the Web site from within Bookshelf (Explorer is included). In addition, monthly updates to the Internet Directory are available from the Web.

Bookshelf's multimedia content is slim. The information provided doesn't dig as deeply as other references—but it casts a wider net. As a result, you never know what you'll find on a research expedition. When searching on the word *tornado*, for instance, I was surprised to find an entry on the Mayo Clinic. As it turns out, the highly respected institution was initially set up by nuns to care for the victims of a tornado. And therein lies one of the main attractions of an interactive reference CD like Bookshelf: the joy of serendipity.

Microsoft Encarta 96 Encyclopedia
★★★★/8.5
Microsoft
206/882-8080
http://www.microsoft.com
$54.95 company's estimated price

Of the CD-ROM encyclopedias available, Microsoft's Encarta doesn't have the most in-depth information; that would be Encyclopedia Britannica's Britannica CD 2.0. Nor does it have the simplest interface; there you'd be talking about the 1996 Grolier Multimedia Encyclopedia.

But Encarta is an encyclo-

Alphabet Express Young children can learn how to recognize letters by using animals in Alphabet Express's various interactive scenes. Icons on the right side of the screen help you navigate the program or get help.

Pantsylvania The House of Beauty is just one of ten goofball stops on your tour of Pantsylvania. Using the top menu, you can jump to another destination. At the bottom, the CD's five characters stand by, ready to play tour guide.

pedia with something none of the others have: solid information *and* maximum entertainment value.

For starters, Encarta has a rich treasure trove of multimedia content—8000 photos, 100 minutes of video and animation, and nearly 10 hours of audio. In addition, there are 8 amusing InterActivities—games and small applications with an educational component. With InterActivities, you can test your knowledge of art history, compare the weather in various states, even see if you're getting enough vitamin C in your diet.

Encarta's sophisticated interface and search engine offer multiple options for navigating. I particularly enjoyed the new Guided Tours feature, which lets you explore the content via a specific subject, such as endangered species or famous comedians. And as it does for its other winning CDs, Microsoft offers updates from its Web site. (Look for Microsoft Encarta 97 Encyclopedia Deluxe Edition, due out in fall for $79.95, company's estimated price.) If you're trying to convince the kids that learning can be fun, your best argument is Encarta.

KIDS

Alphabet Express
★★★★/8.2
School Zone Publishing
616/846-5030
http://www.schoolzone.com
$39.95 list price

Surprisingly, a number of multimedia children's titles I looked at had cluttered or downright confusing interfaces. Alphabet Express, an interactive educational program for kids ages 3 to 6, is a marvelous exception.

The CD is designed to teach children how to recognize letters by matching them to animals and objects in various scenes. You're whisked away to those scenes by a train with an alligator for a conductor. Like all good conductors, that sweet ol' gator is always on the job. As you move through the program, the alligator stands by ready to explain what to do. Depending upon where you are in the program, simple icons let you quickly go to the paint book, return to the main menu or the previous screen, and more.

Alphabet Express offers lots to enjoy along the way via connect-the-dots puzzles; mazes; hidden letter games; and two delightful musical animal "movies"—one featuring an octopus, the other starring a chicken who sounds curiously like Little Richard. The kids will have fun picking up new letter skills with Alphabet Express.

Pantsylvania
★★★★/7.4
Headbone Interactive
206/323-0073
http://headbone.com
$29.95 list price

The tag line on Pantsylvania's box says "Get a leg up on learning." In all honesty, the educational value of this children's CD is slim. But kids—and parents—will have hours of fun exploring this off-the-wall program.

There's a lot to do in the kingdom of Pantsylvania—all of it delicious nonsense. First, pick any of the ten destinations to visit, such as the Symfunny Hall, or one of my favorites, Rotten Wrench's Swamphouse. Then decide which of the characters—Bunji, the nerd frog; Kingamajig, the singing monarch; and others—you want as your escort. Within each destination, each character focuses on a certain type of activity; Kingamajig, for instance, is always ready with a song.

For some truly foolish fun, Bunji's your guy—he had me whipping up ketchup shakes in the swamphouse kitchen and helping Carrot Girl find her carrot shoes in the House of Beauty. And once Bunji takes you to the See 'em–Hear 'em–Move 'em–izer, there's no telling what will happen. Simply put, Pantsylvania is one of the most original children's CDs I've seen—and one of the most entertaining. **m**

Former *Macworld* editor JAMES A. MARTIN has written this annual feature since its debut in 1993.

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The Most Advanced Mac 3D Shoot-em-up Ever!

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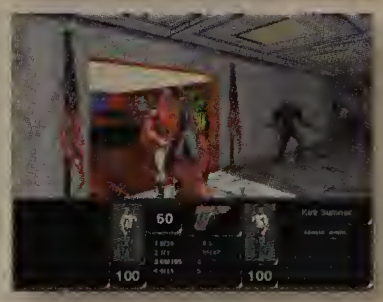
MSRP: ~~$49.99~~ $34.99

SYSTEM REQUIREMENTS: Any Power Macintosh with color monitor and CD-ROM drive.



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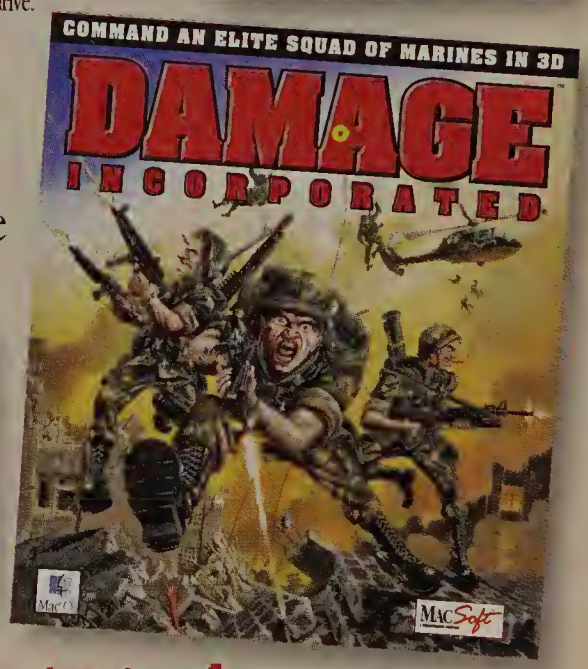
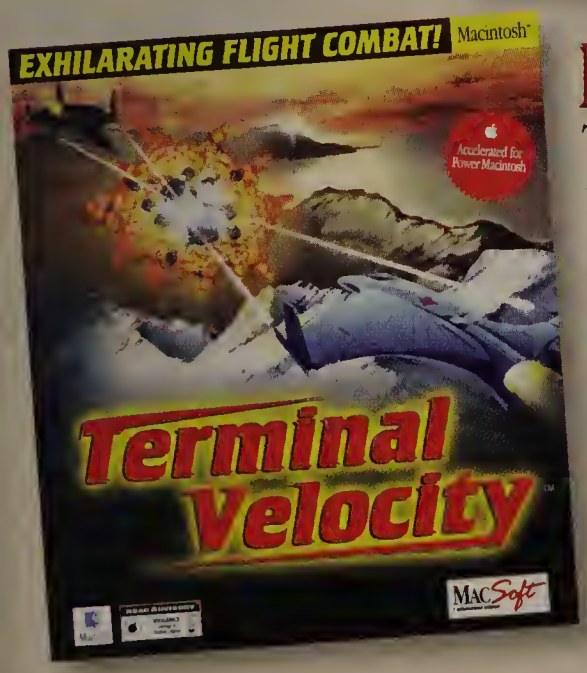
MSRP: ~~$49.99~~ $34.99

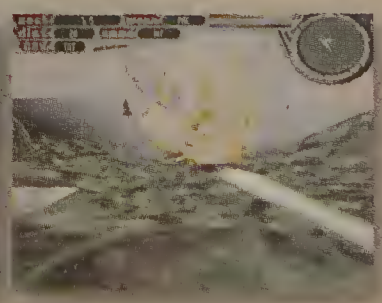
SYSTEM REQUIREMENTS: Any Power Macintosh with color monitor and CD-ROM drive.





Incredible Flight Combat Action!

Terminal Velocity is absolutely the most exhilarating flight game available for the Macintosh. It offers fast 3D texture-mapped graphics, full 360-degree flight movement and 7 weapons of extraordinary destruction. Fight your way through 9 unique planets with an awesome array of spectacular air-to-air and air-to-ground combat action.



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-Computer Gaming World

MSRP: ~~$49.99~~ $34.99

SYSTEM REQUIREMENTS: Any Power Macintosh with color monitor and CD-ROM drive.

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that span out around the head. It was as simple as rotate, copy, and paste. Then I layered the hi-res images in Macromedia xRes. To get seven fingers on the hands, I cloned a finger in xRes and extended it to look realistic. But I also wanted this image to

the text around an arc. Then I used a cool 3D rotating tool, distorting it and giving it a new twist. The fonts I used were created in Fontographer, I picked them up from the Font Bureau. I saved time by using FreeHand's Union Punch/Intersect feature for the lines

Soon-to-be-famous designer Usok S. Choe on the FreeHand Graphics Studio 7: "Here's how I did it. I created the type in FreeHand, rotating

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CD-ROM Drives Accelerate

JOHN ACURSO

MACWORLD LAB TESTS JUST HOW QUICK THE LATEST DRIVES REALLY ARE

MW LAB

by Liza Weiman Hanks

CD-ROM TECHNOLOGY used to promise far more than it delivered. Browsing a multimedia encyclopedia involved long moments staring at the watch cursor. And while CD-ROM publishing was always a cost-effective way to distribute software, installing from a CD was so slow it almost made one yearn for floppy disks.

But CD-ROM drives have become much faster and much less expensive, and they're now standard equipment on all new desktop Macs. They finally deliver on their promise; they work so well that you hardly notice they're there. Browsing an encyclopedia feels spontaneous rather than tedious, and it hardly matters that applications take up tens of megabytes on your hard drive because installation doesn't take all morning.

The newest thing in CD-ROM technology is the 8× drive, an improved CD-ROM reader that aspires to twice the performance of the internal 4× drives installed in today's Macs. The key word is *aspires*. Although all five of the 8× drives and the 6.7× drive we tested performed well, none of them offered double the performance of Apple's 4× drive in our real-world tests (see the benchmark, "Crazy Eights: These CDs Haven't Matured"). They'll save you some time, but are they worth the money?

Artists' Models and More

To answer that question, you need to consider what you're going to do with the drive. Our tests were designed to rate the drives for four hypothetical users: the archivist, who regularly installs large applications; the graphic artist, who uses CDs to store and manipulate artwork; the consumer who browses multimedia titles; and the database professional using a CD to manipulate a large database.

Those who regularly install large application files or work with large graphics files are at the mercy of their drives' data-transfer rates, a measure of the time it takes the CD-ROM drive to send data to your computer. Today's 8× drives purport to offer data-transfer rates of up to 1.2MB per second. But this optimal transfer rate didn't translate into real-world results in our tests, in part because system and drive overhead hold the transfer rates down to less than 0.5 MBps.

Spin City: The Latest CD-ROM Drives

Company	Product	Star Rating*	List Price/Company's Estimated Price	Phone	Mechanism	Bundled Software	Warranty (in years)
Dynatek Automation Systems	CDS658PSD	★★★/6.9	$349/$275	902/832-3000	Plextor PX-83CS	FWB CD-ROM ToolKit	2
Editors' Choice La Cie Limited	8× External CD-ROM Drive for Macintosh	★★★★/7.1	NP/$199	503/520-9000	Plextor PX-83CS	Software Architects CD Mounter Plus	2
Micro Design International	SCSI Express CD37	★★★/5.5	$505/$404	407/677-8333	Toshiba 3701	MDI SCSI Express 2.0	1
MicroNet Technology	Advantage 8× External CD-ROM	★★★/5.8	$249/$249	714/453-6000	NEC CDR1410	MicroNet CD Utility 3.0	1
Philips Electronics	PCA80SC	★★/4.8	$299/NP	408/773-1304	Philips 1269	CharisMac CD-ROM Utility	2
Plextor	8 Plex	★★★/6.6	$539/$514	408/980-1838	Plextor PX-83CS	FWB CD-ROM Toolkit	2

*NP = Not provided. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See* Star Ratings *section for full explanation.)*

Those who spend a lot of time searching databases or encyclopedias should be more concerned with their drives' seek time, which measures how quickly the drive locates data on the CD. The 8× drives, however, don't offer significantly faster seek times than 4× drives: the Plextor mechanism used in three of the drives we tested, for example, took less than 6 seconds in the encyclopedia search, while the 4× mechanism in our Power Mac 7500/100 (a Matsushita 600i) took just under 9 seconds.

Finally, those playing video-based games need to be aware that video playback is optimized by game developers, who aim at the most widely installed base. Currently that is the 4× drive, and developers are unlikely to create titles for 8× drives until they have captured significant market share. Until then, a faster drive won't make video significantly smoother.

Speed Bumps

For this story we tested eight drives. Five were 8× drives; one—the Micro Design International SCSI Express CD37 (*http://www.microdes.com*)—was a 6.7× drive, and for comparison purposes we tested two internal drives, a 4× drive in a Power Mac 7500/100 and a 2× drive in a Power Mac 7100/80.

In none of these tests were the 8× drives twice as fast as the 4× drive. At best, the fastest 8× drives offered a 63 percent performance enhancement (when we opened a Photoshop file) and were between 14 and 45 percent faster than the 4× in the rest of our tests.

The 8× drives, however, were more than twice as fast as the 2× drive in all of our tests, making them a more com-

Crazy Eights: These CDs Haven't Matured

Thinking of upgrading your CD-ROM drive? Not so fast. When we compared the new 8× CD-ROM drives with the CD-ROM drives you'll find in your current desktop Mac (likely the 4× and 2× drives measured below), we found that the new drives were not as fast as you might expect. Overall, the newer 8× drives were only about 25 percent faster than the 4× drive—not 100 percent faster.

Shorter bars are better. Times are in seconds. Products are listed in decreasing order of overall performance.

Drive (Mechanism)	Overall Index	Install Photoshop	Open Photoshop File	Search Encyclopedia	Open Database	Sort Database
Plextor 8 Plex (Plextor 8×)	1.00	40.5	42.1	5.3	37.5	121.0
La Cie 8× External CD-ROM Drive (Plextor 8×)	1.00	40.1	40.8	5.2	40.9	117.8
DynaTek CDS658PSD (Plextor 8×)	0.99	37.9	41.1	5.9	39.3	119.5
MicroNet Advantage 8× (NEC 8×)	0.94	38.9	40.6	6.3	45.8	121.9
Micro Design SCSI Express CD37 (Toshiba 6.7×)	0.93	39.7	42.8	6.5	45.8	117.2
Apple (Power Mac 7500/100) (Matsushita 4×)	0.77	45.8	53.8	8.5	54.5	138.5
Philips Electronics PCA80SC (Philips 8×)	0.58	57.5	42.9	12.2	81.8	344.2
Apple (Power Mac 7100/80) (Matsushita 2×)	0.41	79.6	105.3	15.1	110.1	252.7

Behind Our Tests

Attaching the external CD-ROM drives to the external SCSI bus of a Power Mac 7100, we conducted five separate performance tests. We installed Photoshop from the Adobe Photoshop Deluxe CD-ROM, along with plug-in and tutorial files; opened a 20MB JPEG file from a CD-R disc; performed a compound search on the 1996 Grolier Multimedia Encyclopedia looking for instances of *william* and *shakespeare*, resulting in 103 entries; opened a Claris FileMaker database file from a CD-R disc; and sorted a FileMaker database of 8500 records.—**Macworld Lab testing supervised by Matt Clark**

Comments
Nicely designed; offers speedy performance and FWB's superior driver software.
Price/performance leader; generic design; well-implemented audio software.
This 6.7× drive was slightly slower than the 8× drives, but was sturdy and had well-designed driver software.
Performed well on our tests but lacks a power-on light and external audio-control buttons. QuickPlay feature allows automatic audio playback without running audio software.
Disappointing performance; excellent audio software.
Offers the same mechanism and software as the DynaTek CDS658PSD but at a higher price.

pelling upgrade option for those with internal 2× drives. Micro Design's SCSI Express CD37, a 6.7× drive (with a transfer rate of 1 MBps), outperformed the Philips (*http://www.philips.com*) PCA80SC 8× drive in all five tests but, as you'd expect, was slower than the rest of the 8× drives in our test group.

Of the five 8× drives tested, three—the Plextor 8 Plex (*http://www.plextor.com*), the DynaTek CDS658PSD (*http://www.raider.dynatek.ca*), and the La Cie 8× External CD-ROM Drive (*http://www.lacie.com*)—use the Plextor PX83CS mechanism. This was the fastest mechanism tested, winning in every test but the Adobe Photoshop file-opening test, in which the NEC-based MicroNet Advantage 8× External CD-ROM drive was the winner; even there, the Plextor-based drives were the next three finishers.

DynaTek's drive outperformed the field in the software-installation test, in which we installed Photoshop along with plug-in and tutorial files from the Photoshop Deluxe CD-ROM. The DynaTek drive averaged 37.9 seconds for a task that took the 4× reference drive 45.8 seconds to complete.

In the graphics test we opened Photoshop from the internal hard drive, then opened a 20MB JPEG file from a CD-ROM. The MicroNet (*http://www.micronet.com*) Advantage 8× was the fastest drive tested, averaging 40.6 seconds for a task that took the 4× drive 53.8 seconds to complete.

For the multimedia performance test we opened the 1996 Grolier Multimedia Encyclopedia and performed a compound search for *william* and *shakespeare*. Here access speeds and caching efficiency were the most important factors. The winner was the La Cie 8× External CD-ROM drive at 5.2 seconds, followed closely by the Plextor 8 Plex at 5.3 seconds. Speaking subjectively, all of the drives tested delivered acceptable performance.

Finally, for our database tests, we launched Claris FileMaker Pro 3.0 from the internal hard drive, opened a FileMaker database file from the CD, then sorted 8500 records. As in the multimedia test, access speed and caching efficiency mattered most. The Plextor 8 Plex proved fastest in opening the file, while the Micro Design SCSI Express CD37 was fastest in sorting the file.

Who's Doing the Driving?

Besides ease of use, the most significant differentiating factor was the driver software. We preferred FWB's (415/325-4392, *http://www.fwb.com*) CD-ROM ToolKit, offered by both DynaTek and Plextor. Other packages include Software Architects' CD Mounter Plus (206/487-0122, *http://www.softarch.com*) and CD-ROM Utility from CharisMac (916/885-4420, *http://www.charismac.com*).

CD-ROM drives optimize their performance in part by using caching software, which anticipates your computer's requests and stores the data in RAM or on your hard drive. All the drivers offer automatic caching capability, which attempts to optimize performance, and most allow you to vary the cache size, but only FWB's CD-ROM ToolKit offers extensive customization.

Of the three drives using the fastest mechanism, the Plextor, I'd pick either DynaTek's CDS658PSD or La Cie's 8× External, depending upon which driver you want. The La Cie drive is faster and cheaper at a street price of $199, but the DynaTek ships with FWB's superior CD-ROM ToolKit software and has a more attractive two-toned exterior design, a fan, and an extra power connection at the back for a street price of $275. At more than $500, Plextor's offering is pricey, and its installer is not nearly as well implemented as DynaTek's.

MicroNet's drive was the winner in the Photoshop-based tests, and the second-place finisher in the installation test. But it lacks external audio-control buttons, offering only a headphone jack and a volume control. It also has no power-on light. Worse, its installer's default option attempts to install the driver on the floppy disk instead of the hard drive, resulting in a cryptic error message that is not mentioned in the otherwise excellent manual.

The Philips PCA80SC turned in a disappointing performance overall, always finishing last among the 8× drives, and was slower than our 4× reference drive in all but one of the Photoshop tests.

Micro Design's 6.7× drive performed at a level just below the rest of the 8× drives, though it is not a bargain and had a small-print provision in the manual that we found breathtakingly ungenerous: if you return a product, and Micro Design's testing reveals that it is not defective, you will be "assessed a minimum bench fee of $125," charged COD when the company returns the product.

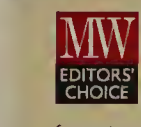
The Last Word

If you have a 2× CD-ROM or no CD-ROM at all, I'd recommend buying an 8× drive. You'll be thrilled at the speed improvement. If you have a 4× drive, though, you might need to decide if a 17- to 60-percent performance increase is worth the investment. In fact, you may want to hold off on purchasing a new drive until 4.7GB DVD (digital versatile disk) drives appear next year.

If you want the small speed boost up to 8×, I'd recommend buying the La Cie 8× External CD-ROM Drive. It has the speedy Plextor mechanism and a bargain price. If you don't like its driver software, you can buy the retail version of FWB's CD-ROM ToolKit for $79 and still come out ahead on the deal. **m**

LIZA WEIMAN HANKS has been covering Macintosh technology since 1987.

CD-ROM DRIVES



Macworld Lab tested five 8× CD-ROM drives and one 6.7× to compare transfer rates and access speeds in real-world tasks.

★★★★/7.1 **La Cie 8× External CD-ROM Drive.** It combines a speedy mechanism with a bargain price and a two-year warranty. **Company:** La Cie (503/520-9000, *http://www.lacie.com*). **Company's estimated price:** $199.

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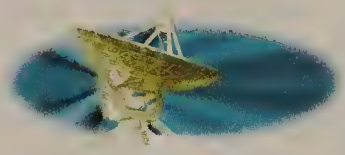

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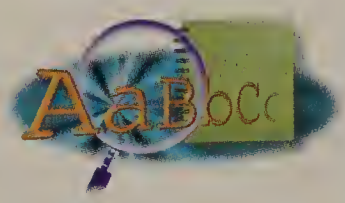
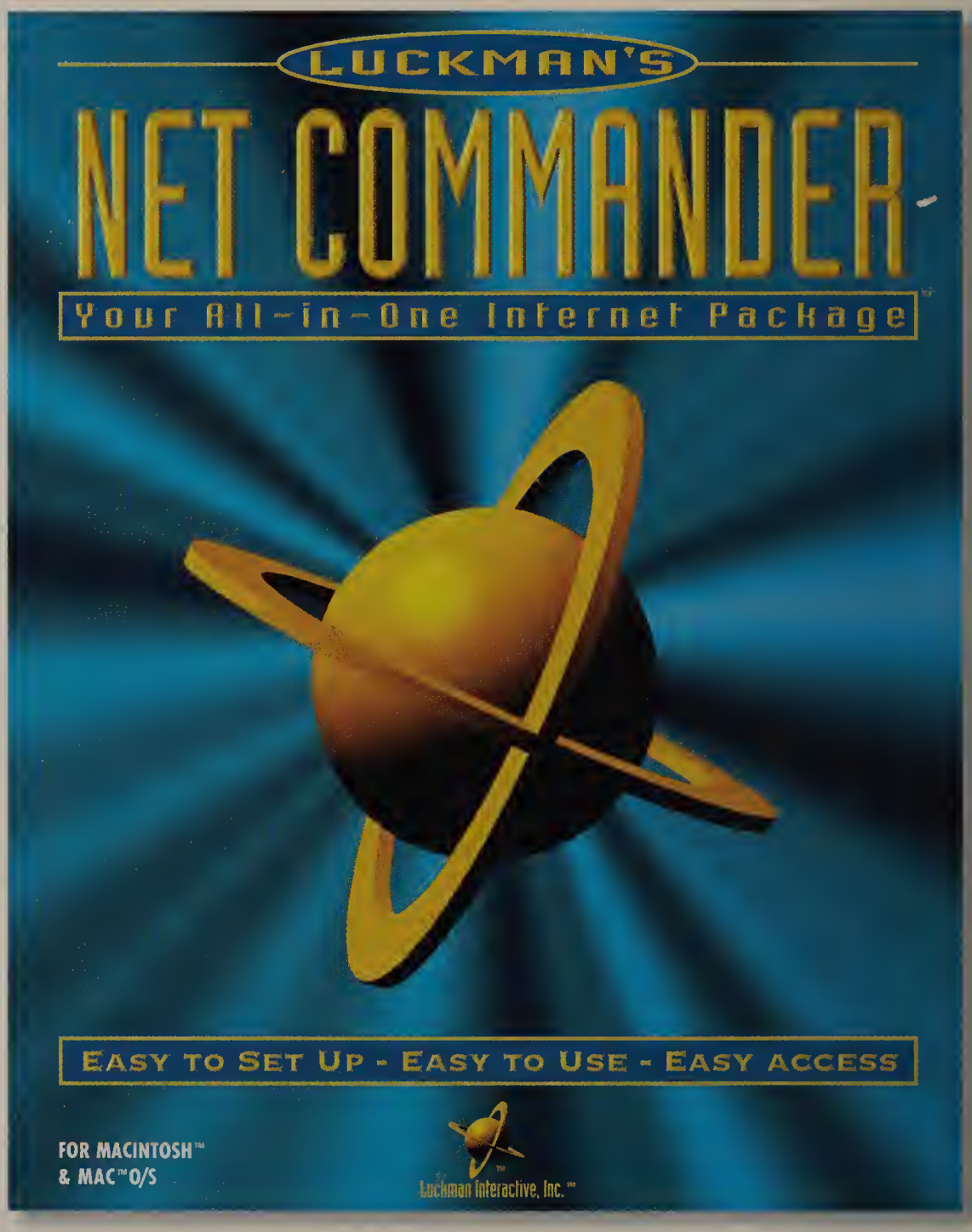
Document Readers



Utilities

Auto Account Registration



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Secrets

The Launcher Nobody Knows

APPLE'S ONE-CLICK FILE-LAUNCHING UTILITY GROWS UP

by Joseph Schorr

The Launcher control panel had humble beginnings. It started life as part of the Performa operating system, providing a simple way for less experienced Macintosh users to launch programs. The Launcher presented all the programs on a hard drive as big, chunky buttons. A single click launched a program and got you rolling. Now a standard part of the Macintosh OS, the Launcher isn't just for novices. With a few tweaks, you can give it considerable power and elegance.

The Launcher Basics

Anything in the Launcher Items folder (inside the System Folder) gets transformed into a button on the Launcher control panel. With System 7.5.1 or later, adding items to the Launcher Items folder couldn't be easier: you simply drag a file to the Launcher window; the Mac creates an alias of the dragged item and moves the alias to the Launcher Items folder; and a new button appears in the Launcher window.

To keep Launcher buttons organized, you can group them into categories. To add a category button to the Launcher, you create a folder within the Launcher Items folder and start the name of the folder with a bullet (•, option-8). The folder name then appears as a category button at the top of the Launcher control panel, and any items you place within the folder appear in the Launcher only when you click on the appropriate category button. (When you create new categories, any items already in the Launcher Items folder get put in a category named Applications. To eliminate it, place all items inside your custom category folders.) You're allowed up to eight different category buttons.

There is a way around the eight-category limit: create multiple Launcher Items folders and swap them in and out of the System Folder as needed. For example, you can have one set for work applications, another for games, and so on.

Of course, swapping Launcher Items folders isn't terribly convenient. A far better solution is to use AppleScript to automate the process of reconfiguring your Launcher with a single click (see "Eight Isn't Enough").

Power Launching

As its name implies, the Launcher is designed primarily for launching programs, but in fact you can add *any* file to the Launcher—documents, folders, control panels, sounds, disk icons—not just

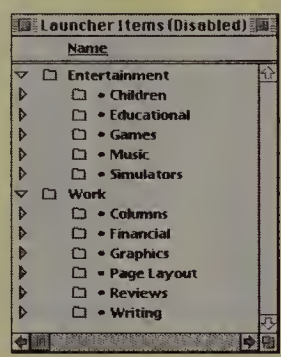
continues

JEFF NEUMANN

EIGHT ISN'T ENOUGH

You can get around the Launcher's eight-category limit by creating separate sets of Launcher categories. Here's how to make a pair of simple scripts that automate swapping two sets.

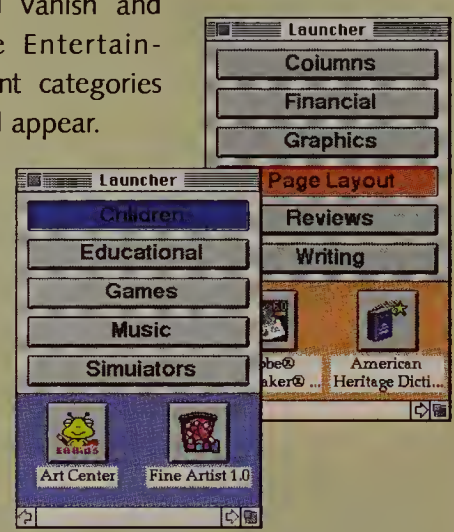
1 Create a folder in the System Folder called Launcher Items (Disabled). Inside that folder, create a separate folder for each set of Launcher items you want to create—let's make one set for work and one for entertainment. Inside each folder, create subfolders with the names of the categories you want to include in the Launcher.



2 In AppleScript's Script Editor, create one script for the Work set (below) and one for Entertainment (duplicate the script below; change Entertainment to Work and vice versa). Each script shuttles one set of category folders out of Launcher Items (and into the disabled folder) and plugs in the other set. Save the scripts as applications and check the Never Show Startup Screen option in the Save dialog box.

```
tell application "Finder"
    activate
    move every folder in folder "Launcher ¬
        Items" of folder "System Folder" of ¬
        start up disk to folder "Entertainment" ¬
        of folder Launcher Items (Disabled)" of ¬
        folder "System Folder" of startup disk
    move every folder in folder "Work" of ¬
        folder "Launcher Items (Disabled)" of ¬
        folder "System Folder" of startup disk ¬
        to folder "Launcher Items" of folder ¬
        "System Folder" of startup disk
end tell
```

3 With the Launcher Items folder empty, try running the first script. The Work categories will instantly be installed in the Launcher. You can now drag icons to the Launcher to install buttons under each category. When you run the other script, the Work categories will vanish and the Entertainment categories will appear.



4 To make this setup even more elegant, add the script that activates Entertainment to the Work category and add the script that activates Work to the Entertainment category. Now, with a single click, you can switch to your alternate set of categories. (You have to click elsewhere in the Finder and then click again in the Launcher to refresh the Launcher window.)

Launching 101 (for System 7.5.3)

TO DO THIS:	USE THIS METHOD:
Add an item to the Launcher	Drag its icon into the Launcher window.
Remove a button from the Launcher	Option-drag the button to the Trash.
Change the size of Launcher buttons	⌘-click on the Launcher window and choose a new size from the pop-up menu.
Open a category folder located in the Launcher Items folder	Option-click on a category button.
Change a button from one category to another	Option-drag the button and drop it on the desired category button.

applications. Dragging an item into the Launcher window generally takes less time than creating a new alias and then moving it to a designated spot on your hard drive. With that in mind, consider a few timesaving tips that make good sense for any user, whether new or a seasoned professional.

• Drag frequently accessed folders to the Launcher to create one-click shortcuts to all the folders you open the most. This is especially useful if you tend to root around in deeply buried folders on a number of different file servers.

• Set up a Launcher category called Control Panels for the control panels you use the most.

• Create Stickies stationery documents (see *Secrets*, March 1996) and drag them to the Launcher to install ready-to-use notes.

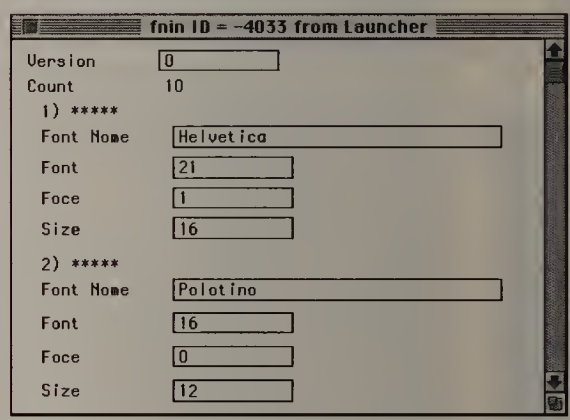
• If you use AppleScripts to automate tasks on your Mac, drag the applets to the Launcher to create a command center for your automated tasks.

• Create category buttons for projects you're working on, then group all related documents and applications under the appropriate categories.

Changing the Launcher Landscape

The Launcher may be handy, but it sure isn't pretty. Though you can't change the garish background colors, you can change the fonts if you're willing to poke around with ResEdit.

Open a copy of the Launcher with ResEdit, and double-click on the fnin resource icon to open it. Open resource



New Launcher Look You can use ResEdit to personalize your Launcher's fonts. Here the category labels are set to 16-point Helvetica, and the Launcher buttons to 12-point Palatino. (To see the results, check out step 3 of "Eight Isn't Enough.")

-4033 (see "New Launcher Look"). As you scroll through it, you'll see ten Font Name fields containing the name *Geneva* and ten Font fields containing the number 3. The first set of fields controls the font used in category buttons. The next nine are the fonts used for Launcher buttons in various sizes, to correspond with the three different-size Launcher buttons you can create.

Simply replace the word *Geneva* with the name of the font you want to use and replace the 3 with the appropriate font number ID. (To ascertain a font's number ID, open that font's suitcase with ResEdit, open the FOND resource, and note the ID number associated with the font in the resource list.) Type a point size in the Size fields to set a size for each font. **m**

Contributing editor JOSEPH SCHORR is coauthor of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).

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Quick Tips

Tips, Tricks, and Shortcuts

by Lon Poole

When you take a PowerBook through airport security and are asked to turn it on, the last thing you want to do is wait through a lengthy start-up. Waking a sleeping PowerBook is fast enough, but who wants to waste battery power while the PowerBook sleeps through check-in? Christopher Eliot of Leeds, Massachusetts, suggests using the Password Security control panel that comes with PowerBook 190, 2300, and 5300 models. The Password Security dialog box comes up quickly on start-up and proves that you have a computer, not a bomb. Then hit the Cancel button to shut down quickly so you can make your plane. Whatever you do, don't forget your password, because you can't bypass the security dialog by starting up with the shift key pressed or by starting up from a Disk Tools floppy—the password control is handled at the disk-driver level. You'll have to take your PowerBook with proof of purchase to an authorized service center, where a technician can bypass the security dialog box.

If you have an older-model PowerBook, you can't use the Password Security control panel. In that case, either hold down the shift key for a fast start-up at the airport, or download one of the many quick-start extensions available online. Scout's Honour 1.1 written by John Bullock, Airport Quickstart 1.0.2 from John Bascombe, and Zorba 1.0.2 by Jon Wind are all freeware extensions designed to provide a quick start-up and shutdown for airport security agents. And they work on any model PowerBook.

These extensions as well as other shareware and freeware mentioned in *Quick Tips* this month are available from Macworld Online (*http://www.macworld.com*) or from the Macworld area on America Online (keyword *Macworld*).

Speech Mutes Performa

Q When I use speech recognition on my Performa 6205CD, my Mac goes mute. This includes the system alert sound. When I turn off speech recognition, I get all my sounds back. How can I get both working at the same time?

SAM HOOVER
Bartlett, Tennessee

A An interaction between version 1.4.1 of the speech-recognition software and the sound circuitry in the Performa 5200, 5300, 6200, and the 6300 series silences sound if you turn on the Speakable Items option in the Speech control panel. You can fix the problem by installing version 1.5 of the Speech Recognition extension, which is available from the Read Me page of Apple's Speech Technology Web site, *http://www.speech.apple.com/speech/dev/readme.html*. Version 1.5 also fixes a bug that prevents PowerPC PowerBooks such as the PowerBook 5300 from working with the built-in microphone. Note that speech recognition requires 16-bit sound input and does not work on early production models of the Performa 5200 and 5200 LC, which have 8-bit sound input. You can determine whether a 5200 has 16-bit sound input by looking at the Sound Out settings in the Sound control panel. If the 16-bit option is grayed out, the 5200 has 8-bit sound, and speech recognition won't work. Speech recognition is only half of Apple's PlainTalk speech technology. The other half, text-to-speech, works on all Mac models (except those older than a Plus).

Desktop Printing

Q I recently installed System 7.5 Update 2.0 (a.k.a. Mac OS 7.5.3). A Read Me file says I can use drag-and-drop printing (whatever that is) without installing QuickDraw GX, by using Desktop Printer 1.0.3. I didn't find it in the Update; how can I obtain it?

STEPHEN J. BECK
Garden City, New York

A For readers who haven't heard of desktop printing, it lets you create desktop icons for the printers you use. You use these desktop printer icons to manage background printing, choose a default printer, and print documents on any printer simply by dragging the document icon to the desktop printer icon. Desktop Printer 2.0, which is newer than the version included with System 7.5 Update 2.0, is available from Apple's Software Updates Web site (*http://www.info.apple.com/swupdates/*)

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4th Dimension	6
HyperCard	4
Illustrator	6
Infini-D	2
Internet	1
LogoMotion	1
MacProject Pro	4
Mac Troubleshooting	3
Mac Operating System	4
Microsoft Project	4
Microsoft Works	5
MiniCad	2
Norton Utilities	1
Now Contact	1
Now Up-to-Date	1
Now Utilities	1
PageMaker	7
Painter	4
Persuasion	2
Peachtree Accounting	4
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either separately or as part of the LaserWriter 8.4 software. (You'll need Chad Magendanz's shareware ShrinkWrap, available from Macworld Online [*http://www.macworld.com/software/paul/Software.256.html*], or another disk-image utility to install the software. See *Quick Tips*, December 1995, for more information on disk-image utilities). Version 2.0 lets you move printer icons from the desktop into folders. In addition, you can custom-install an extension that adds a printer-switching menu to the right end of the menu bar.

System 7.5 Update 2.0 includes Desktop Printer 1.0.3 as an upgrade to an already installed older version. If desktop printing isn't installed on your Mac, you need to get the complete desktop printing software from Apple's Web site.

Be forewarned: there is a glitch in Desktop Printer 2.0. If you move the default printer icon to a closed folder, the Printing menu remains visible but the menu's commands—such as Start Print Queue and Stop Print Queue—do nothing even though they are not dimmed. To use the Printing menu, you need to open the folder, deselect the printer icon, and reselect it. (The Printing menu should not appear in the menu bar unless a printer icon is selected.)

Year 2000

Q I keep hearing about the year 2000 and the problems it will create for computers and computer software. How will this affect my Mac Performa 5300 and the word processing, illustration, desktop publishing, and database software I use? Is there something I should be doing to minimize any problems associated with this event?

DAVE MAGYAR
Andover Township, New Jersey

A Don't worry about the Mac OS. Since its debut in 1984, the Mac has correctly handled dates between January 1, 1904, and February 6, 2040. The current Mac OS, System 7.5.3, handles dates between 30,081 B.C. and 29,940 A.D. (for people who plan ahead). Applications that use the date and time code in the Mac OS to deal with dates will have no problems

continues

An Impossible Bar Chart

If you've ever tried to make a stacked bar chart with multiple groups, like this one, you've no doubt discovered that the procedure is not at all obvious. In fact, it may seem impossible. The key to making this type of chart is laying out the data. Here's the method that Shane Devinshire of Walnut Creek, California, uses.

1. Set up the data as shown in the Excel spreadsheet below left. Select the whole range of data, and create a new chart (choose Chart from the Insert menu or click the Chart Wizard button).

2. Select the new chart, choose Auto Format from the Format menu, and set the chart style to format number 3 in the Column gallery.

3. Choose Column Group from the Format menu, and in the dialog box that appears, click the Options tab and set the Gap Width to zero. You'll end up with a chart like the example below right.

	Jan	Feb	Mar	Apr	May
Admin95	34	37	40	43	46
Admin96	39	42	45	48	51
Serv95	44	47	50	53	56
Serv96	49	52	55	58	61
HR95	36	39	42	45	48
HR96	52	55	58	61	64
Tech95	12	23	34	45	56
Tech96	42	53	64	61	67

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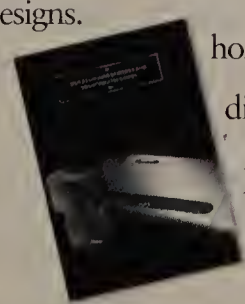

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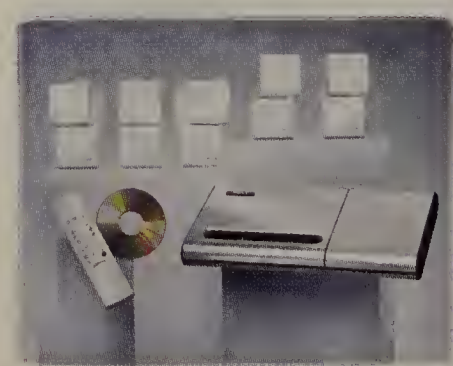

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with the year 2000. Adobe says the changing of the century is not an issue for its products, nor for the time-stamping in its PDF file format. Microsoft says its products all support dates well into the next century, but notes that if you enter a date in the form MM/DD/YY, some applications assume the year is 19YY. Microsoft products will be updated in 1997 to make it easier for the user to assume the year is 20YY, and Microsoft recommends that by the end of the century you upgrade all your software to versions that assume a short date format is in the twenty-first century to avoid confusion.

A Shade Different These halftone images look different because they have different file formats. Both images were printed on a Hewlett-Packard LaserJet 4M, a 600-dpi PostScript printer without image enhancement, from QuarkXPress 3.3 with the screen frequency set to 100 lpi. The top image was saved as an EPS file in Photoshop 3.0, with the Include Halftone Screen option selected, after first setting the screen frequency to 100 lpi with Photoshop's Page Setup command. The bottom image was saved in Photoshop as a TIFF file.

Claris says currently shipping versions of its software correctly display both manually entered and calculated dates at least through 2019. For instance, FileMaker Pro 3.0 assumes a two-digit year you enter in the range 00 through 09 is in the next century if the current year is 90 through 99, and a year you enter in the range 90 through 99 is in the previous century if the current year is 00 through 09. Those assumptions only apply to two-digit years you enter in FileMaker Pro 3.01's Browse mode. Two-digit years (dates in the form *mm/dd/yy*) entered in FileMaker Pro 2.1 databases are always in the 1900s, even after being converted to FileMaker 3.0 databases. Likewise, FileMaker Pro 3.0 considers two-digit years to be in the twentieth century if you add them to any FileMaker database with the Import Records command, by script command, by Apple events, or by drag-and-drop editing.

You may encounter problems with custom applications built on databases such as Claris FileMaker, ACI US 4th Dimension, and ProVue Panorama; spreadsheets such as Microsoft Excel and ClarisWorks; or scripting environments such as HyperCard, AppleScript, and UserLand Frontier. Databases, spreadsheets, and scripts need to store dates in a format that does not truncate the century, or else date comparisons, calculations, and sorting will be incorrect beginning in 2000. What's important is how the date is stored, not how it's displayed or printed. For example, Excel and ClarisWorks cells can be formatted to display dates in the form MM/DD/YY, but each date value is stored as a serial number that implicitly includes the full year and will work properly after 2000. In contrast, cells that keep track of years separately as two-digit numeric values such as 96 (for 1996) are subject to obvious sorting, comparison, and calculation errors when the year becomes 00 (for 2000). Be on the lookout for two-digit years in spreadsheet cells and database fields, and convert them to four digits soon.

Similar though probably less serious problems await if you have files whose names begin with dates, such as 961227, so that the files appear chronologically in Open dialog boxes and when viewed by name in the Finder. If we're lucky a future version of the Mac OS might allow viewing by date in an Open dialog box as well. Of course you can rectify the file-name problem by including the century as part of the date (for example, 19961227), but you must use up two more of the file-name characters to do so.

Dithered Halftone Screens

TIP To get better-quality halftones, I was about to replace my 600-dpi HP LaserJet 4M printer, which has no image-enhancement features, with a 1200-dpi printer or a 600-dpi printer with image enhancement. Then I discovered a technique for enhancing halftone images with Adobe Photoshop, as shown in "A Shade Different." First you use Photo-

continues

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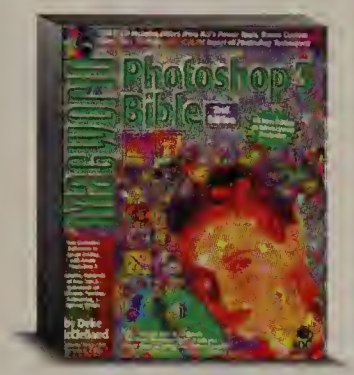

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1. Macworld
2. Pub. No. 07418647
3. Date of filing: October 1, 1996
4. Published monthly
5. No. of issues published annually: 12
6. Annual subscription price: $30.00
7. Known office of publication:
501 Second St., San Francisco, CA 94107
8. Complete mailing address of the headquarters of general business offices of the publisher:
Macworld, 501 Second St., San Francisco, CA 94107
9. The names and address of the publisher, editor, and managing editor are Publisher: Colin C. Crawford, Macworld, 501 Second St., San Francisco, CA 94107; Editor: Adrian Mello, Macworld, 501 Second St., San Francisco, CA 94107 Managing Editor: Ruth Henrich, Macworld, 501 Second St., San Francisco, CA 94107
10. The owner is: IDG COMMUNICATIONS, INC., Patrick McGovern, 5 Speen St., Framingham, MA 01701.
The names and addresses of stockholders owning or holding 1% or more of the total amount of stock are listed below.
None
11 There are no known bondholders, mortgagees, or other security holders owning or holding 1% or more of the total amount of bonds, mortgages, or other securities.
13. Publication name: Macworld
14. Issue date for circulation data below: October
15. Extent and nature of circulation: Average no. copies each issue during preceding 12 months:
A. Total no. copies (net press run), 817,373;
B. Paid and/or requested circulation 1. Sales through dealers and carriers, street vendors and counter sales, 113,143; 2. Mail subscription; (paid and/or requested), 523,380 C. Total paid and/or requested circulation (sum of B1 and B2),636,524
D. Free distribution by mail carrier or other means, samples, complimentary, and other free copies, 38,189; E. Free distribution Outside the Mail , 0; F. Total Free Distribution, 38,189.
G. Total distribution (sum of E and F), 674,713
H. Copies not distributed: 1. Office use, left over, unaccounted for, spoiled after printing 2,663;
2. Return from news agents, 139,997; I. Total (sum of G, H1 and H2 -should equal net press run shown in A) 817,373 Actual no. copies of single issue published nearest to filing date: A. Total no. copies (net press run), 811,000;
B. Paid and/or requested circulation:
1. Sales through dealers and carriers, street vendors and counter sales, 106,044; 2. Mail subscription (paid and/or requested), 513,648; C. Total paid and/or requested circulation (sum of B1 and B2) 619,692;
D. Free distribution by mail carrier or other means, samples, complimentary, and other free copies, 39,357; E. Free Distribution Outside the Mail, 0; F. Total Free Distribution, 39,357; G. Total distribution (sum of E and F), 659,049; H. Copies not distributed: 1. Office use, left over, unaccounted for, spoiled after printing 2,660; 2. Return from news agents, 149,291; I. Total (sum of G, H1and H2 should equal net press run shown in A): 811,000.
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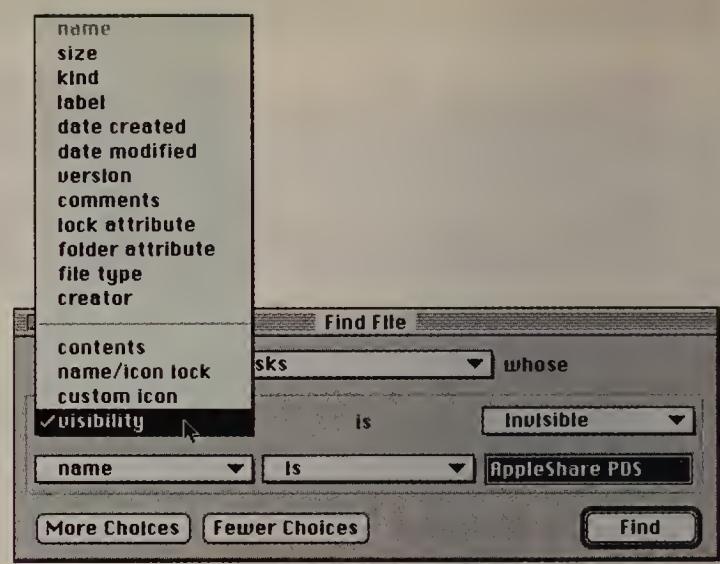
Colin C. Crawford, President.

shop's Page Setup command to set the screen frequency. A 600-dpi printer commonly uses 85 lines per inch (lpi), but I get better results with 100 lpi. Then you save the image as an EPS file, making sure to turn on the Include Halftone Screen option. Photoshop's included halftone screen overrides the halftone screen of your page-layout program and of all other halftone screens (except the special screen provided by some output devices such as Linotype-Hell's HQS).

Although there are only 36 sizes of halftone spots (distinct levels of gray) mathematically possible at 600 dpi and 100 lpi, this screening technique achieves more levels of gray by mixing halftone spots of different sizes to achieve an intermediate level of gray. For example, your eye perceives a level of gray between level 12 and 13 if the halftone intersperses spots of size 4 with spots of size 12. (Halftoning simulates levels of gray with black spots of different sizes; the larger the spot, the darker the gray.) At very light gray levels, this screening technique uses the smallest halftone spot but leaves many of them out of the screen grid. If your PostScript printer doesn't provide gray-scale enhancement, this technique gives you a way to achieve smoother gray-scale output.

DANNY SOLOMON
Dublin, New Hampshire



Hidden Attributes System 7.5's Find File utility can search by four attributes you don't normally see—visibility, custom icon, name/icon lock, and text contents. Find File lists them at the bottom of an attributes menu when you press the option key while popping up the menu. To learn more Find File tricks, choose Find File Shortcuts from Find File's Guide (question mark) menu.

Quick Bits

• If you want to connect only two Macs for file sharing, Jeff Knox of Las Vegas, Nevada, suggests using an inexpensive serial cable like the one you would use between a Mac and a StyleWriter. When a tip way back in May 1992 recommended this method for connecting one Mac to a LaserWriter, a reader reported unreliable printing, and a dealer claimed to have seen several Macs with serial ports damaged by using serial cables for network connections. Now Apple's online Technical Information Library specifically approves the use of Apple's Peripheral-8 serial cable (part M0197) for a two-node network. Of course, if you want to connect more than two network devices, you must use network connectors and cable like the ones described and illustrated in September's *Quick Tips*.

• If file sharing mysteriously stops working or takes more than a few minutes to get started, Eduardo Revuelta of Cochabamba, Bolivia, suggests you remove the invisible file named AppleShare PDS from each disk you make available for sharing, and then restart your Mac. You can use Systems 7.5's Find File utility to find invisible files as shown in "Hidden Attributes," and you can remove items that Find File lists in its Items Found window by dragging them from that window to the Trash. After restarting, you have to use the Finder's Sharing command to redo the sharing privileges for your shared folders, disks, and programs. You don't have to reenter the settings in your Users & Groups control panel, as you do if you try to fix a file-sharing problem by removing the File Sharing Preferences and Users & Groups files from your Preferences folder and restarting (as suggested in "Matters of Preference," *Secrets*, June 1996). **m**

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

We pay from $25 to $100 for tips published here. Send questions or tips on how to use Macs, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

NetSmart

Better, Faster Web Searching

by Charles Seiter

Recently I riffled through my giant collection of bookmark folders and discovered that 10 percent of the month-old bookmarks were out of date (site moved or missing), and 22 percent of the two-month-old bookmarks were out of date. Stale bookmarks are about as useful as stale bread and just as inevitable, thanks to the dynamic nature of the World Wide Web.

Happily, several Web search engines can find a page on the Web faster than Find File can locate a file on my hard drive. To me, it makes sense to throw out the bookmark files and stay up-to-date with fresh searches all the time. Of course, speed isn't everything. You also want to find the most relevant material with the least effort. To make this happen, it helps to know what kinds of results to expect from the different services, to know a few advanced searching tricks, and to check out the metasearch services, which use several engines at once.

Getting Started

The present champion of hit quality is Infoseek's new Ultra site, which has an elaborate set of built-in rules for guessing which sites match what you really want (and it's nearly as fast as AltaVista). Surprisingly, given the mixed record of artificial-intelligence apps over the last decade, Ultra works quite well. The first three or four sites you find in each topic search are usually excellent places to start gathering information.

AltaVista and WebCrawler are faster than Infoseek but often produce some absolutely baffling results. When I used nine major search services to look for an article on *Macworld*'s Web site (*http://www.macworld.com*), for example, Infoseek Ultra produced exactly two hits, both correct references to the article in question (see "Finders, Weepers: Search Engines Compared"). The services that earned an F found no references to the article, which had been posted for one month, and the services with low grades turned up hundreds or thousands of scattered references to everything under the sun, sometimes finding the article and sometimes not.

Make Friends with AND, OR, NOT

These results bring up a key search issue: as the Web grows, narrower and more specific searches are more valuable—who has time to page through thousands of hits, even with a T1 line? (And at three minutes per, how long does it take to check out the 380,000-plus Dennis Rodman hits on Excite? Hint: if you only have four hours a day to spend on this, Rodman's basketball career will be over long before you're through.) So you need to master the use of logical restrictions.

The most useful restrictor is AND, which means the search should return only sites that have all the search terms. It takes three forms. On AltaVista, the older mode using a plus sign (+) is the style, as in `+shogi+.edu` to find Shogi sites at universities in the United States. In most other services this becomes `shogi AND .edu` (Infoseek also can use the + notation), and you use the Advanced Search option to call up a form that lets you specify whether your search words are joined by AND (usually phrased as "site contains *all* terms" in a pull-down list) or by OR ("site contains *any* of the terms").

The other important option is NOT, represented literally as NOT in some services, by the minus sign (–) in AltaVista and Infoseek, and as a pull-down AND NOT option list in others. Often NOT is the best bet for cleaning up an overlong search list of sites: a search on AltaVista for *+shogi-.www.nttam.com* drops out a giant number of Japanese-language sites (those maintained by Japanese corporation NTT) but leaves the translated sites on the list. Using the right NOT term is one of the fastest ways to sharpen your search results (see "Boolean Boogie" for other examples).

OR, by contrast, widens your search; this was useful in

continues

Finders, Weepers: Search Engines Compared

JUST HOW USEFUL ARE the most popular search engines for the Web? To find out, I did four searches across nine services. I scanned for sites for *shogi* (Japanese chess), *subtilisin* (an important enzyme), *Dennis Rodman* (the popular basketball player), and for a specific *Macworld* article that had been on the Web for a month. The results were surprising: there's not much correlation among search engines when it comes to size, speed, and quality of results.

At least four services claim to be the biggest on the Web, with more than 50 million sites indexed. Even so, it's hard to believe that Dennis Rodman, despite his astonishing coiffure, is really mentioned on more than 380,000 sites, as claimed by Excite. WebCrawler, Magellan, and HotBot, however, produced reasonable results in the science-oriented search. HotBot uncovered one irrelevant find for *subtilisin*, a pretty severe dismissal of the service's claim on its home page, that it "is the most complete Web index online."

What can't be captured without a large collection of examples is the uselessness of 5000 hits. On the *shogi* search, some services, notably AltaVista, took a truly international approach—serving up page after page of hits in Finnish, Dutch, and the ASCII scramble that means the site's in Japanese. Others, particularly Infoseek, realistically assume that few Americans are adept polyglots and filter so you get only English-language sites, or put English-language sites at the top of the list.

My search for the *Macworld* article was an effort to see how up-to-date the search engines are—and the answer was, not very. Magellan came up with a total of 1420 references, and not a single correct one was included in the first screen of results. Based on this search, I'd give Infoseek an A+ for the timeliness of its information, followed by Excite (C), HotBot (C–), Lycos (D–), and Magellan (D–). AltaVista, OpenText, WebCrawler, and Yahoo failed this test entirely.

	SEARCH TERMS			
Engine	**Rodman**	**subtilisin**	**shogi**	**Macworld** [A]
AltaVista Search *http://www.altavista.digital.com*	2000	600	4000	0
Excite Search *http://www.excite.com*	385,624	943	3708	180 [B]
HotBot *http://www.hotbot.com*	8673	1	5568	261 [B]
Infoseek Ultra *http://ultra.infoseek.com*	3711	329	1229	2 [C]
Lycos *http://www.lycos.com*	2278	164	884	582 [D]
Magellan Internet Guide *http://www.mckinley.com*	17,156	0	236	1420 [D]
Open Text *http://index.opentext.com*	748	410	549	0
WebCrawler *http://webcrawler.com*	6500	10	110	0
Yahoo *http://www.yahoo.com*	12 [E]	0 [E]	12 [E]	0

[A] *Refers to search for a specific Macworld article; search string was Macworld AND sculpt AND "molecular remodeling."* [B] *Correct references appear in the first screen.* [C] *Both references are correct.* [D] *No correct references on first screen; may or may not be on a subsequent screen.* [E] *Yahoo refers the user to a parallel search performed on AltaVista because of its own limits.*

1994, but you aren't likely to want it often in the current state of Web evolution. The services that return boatloads of sites typically put an OR automatically between the search terms you enter, apparently figuring that it looks better to give you towering piles of irrelevant sites rather than the much smaller collection you'd see if the search engine inserted AND. In many cases, if you have decided on a general search topic, any other term you would add with an OR simply deteriorates the quality of the hit list.

Metasearch Sites

One way to spend less time searching and get better-quality results is to compose exact searches (lots of specific AND terms) and then perform the search using a metasearch service. Metasearching simply means automatically searching several services at once. SavvySearch, for example, sends your query to every service worth considering, as well as to some that have fallen behind the times. So does MetaCrawler, which in fact hustles along quite a bit faster than its name would suggest (and is really an ongoing academic experiment in metasearch design). The simplest service is all4one, which searches only Yahoo, Lycos, AltaVista, and WebCrawler.

Yahoo defaults to AltaVista if it can't find results on its own site (that is, it brings up an AltaVista page with results from the same query you sent to Yahoo), and Lycos and WebCrawler often have both irrelevance and update-frequency problems. As a result, you could readily pick a four-site metasearcher with better prospects (say, Infoseek Ultra, AltaVista, HotBot, and OpenText), as the University of Kansas ProFusion site allows you to do (see "Web Worthy").

Metasearching is easy now with AppleScript or JavaScript; see *http://www.robtex.com/search.htm* for a Java-based search service you can add to your home page. Basically, scripting tools let you customize your own search page to send a query to your choice of services simultaneously. This used to be an expert-level HTML challenge; now it's closer to an end-of-the-chapter exercise in a beginning Java book.

Software Tools

What you use to search for information can be as important as where you search. There aren't many searching tools per se, because the software effort has gone into search-site design. But the tools below belong on your hard drive if your Web work has progressed beyond doodling through cool sites.

Retrieve It 2.5 At $39.95 it's not shareware. But Retrieve It 2.5 (reviewed in this issue), from MVP Solutions (*http://www.mvpsolutions.com*), not only does very fast search-

es of downloaded files, it also automates Web searching and speeds it up by a factor of two or more. (When you're used to Retrieve It, using Find File is like watching a BB sink in a fish tank full of honey.) That means it's significantly faster to search Infoseek through Retrieve It than directly through a browser.

This may not make much difference to you if you're a patient soul and are also paying a flat monthly rate to an Internet service provider, but if you are one of the millions of Macintosh users who rely on America Online, Retrieve It 2.5 can quickly pay for itself in savings from AOL-based Web searching. From Retrieve It's perspective, the rest of the Web is just another set of hard drives to search, and it implements this approach in a small, fast, efficient program.

BBEdit Lite 3.5.1 and HTML Extensions r14 If you do much Web searching, you will have vast piles of text information, and the best way to handle it on the Mac is with BBEdit Lite, a freeware text editor from BareBones (617/676-0650, *http://www.barebones.com*). If you've been using Microsoft Word to open downloaded HTML documents, after a few weeks you may want not only to get the full version ($39 for the upgrade, $119 as a new product), but also to send a birthday present to BareBones's CEO, Rich Siegel.

MacWeb This orphaned browser isn't keeping Microsoft or Netscape execs up late at night, but it may be just the ticket if you need a lightning-fast answer machine you can run from an old LC, if necessary. The Netscape Navigator 3.0 beta used to research this column needs 6MB of RAM to run. If you're mainly searching, most of that 6MB isn't doing you much good. (You may want to view a video once you find it, but if you're just searching for the site, the plug-ins are baggage.) Also, at their current sizes you won't have much luck running Navigator, much less Microsoft Internet Explorer, on any but the most pumped-up PowerBook or on a desktop Mac with at least 16MB of memory.

MacWeb is no longer supported (EINet, which developed it, became TradeWave and now deals with corporations only), but MacWeb 1.00 A3.2 is still available all over the Web (including *Macworld*'s site), runs in less than 1MB on 680X0 or Power Macs, and is less buggy than the ever-changing big-time browsers. For collecting mostly text and static pictures, get MacWeb and make Infoseek Ultra the browser's home page. (By the way, if you're surfing with a 28.8-Kbps modem, a dual-processor 200MHz 604e-based system isn't the right technology anyway.)

Into the Future

We're not far from the day when only old-timers will exchange lists of Web sites. The new low-cost computers designed mainly for Web surfing aren't designed for storing much information, so users can expect to do new searches when they log on rather than calling up old lists of URLs. In 12 to 18 months, three things will happen: multiprocessor servers will become so cheap that high school students will have them in

continues

BOOLEAN BOOGIE

YEARS AGO, WHEN YOU USED TO LOOK THINGS UP in a library, you probably thought of a topic and then looked for that topic in the card file. Since the Web "card file" has more than 50 million cards, it helps to narrow down a search by using more than one search term at once. Many newer services, such as Yahoo and HotBot (shown here) don't use the traditional AND, NOT, and OR operators, but do offer Boolean-style searches by putting the options in a search form with pull-down choices.

To see how search wording affects results, let's take a look at how a search engine would deal with these sentences.

1. It's hot.
2. It's **hot** on the island of **Java**.
3. I'm never awake till I've had a **cup** of **hot java**.
4. Java is the **hot** new **programming** language.

You enter keywords and operators in the search form.

For the broadest search, enter `hot`

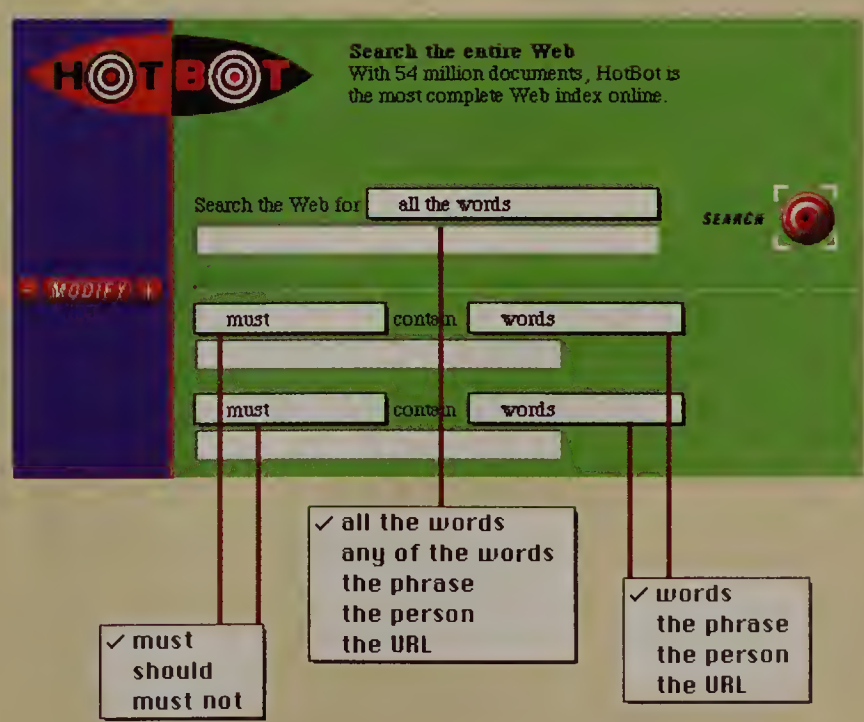
and the search engine finds sentences 1, 2, 3, and 4.

Entering two words `hot java` or `hot OR java`

finds sentences with either word: 1, 2, 3, and 4.

Entering `hot+java` or `hot AND java`

finds sentences with both words: 2, 3, and 4.



Entering `hot+java+programming`

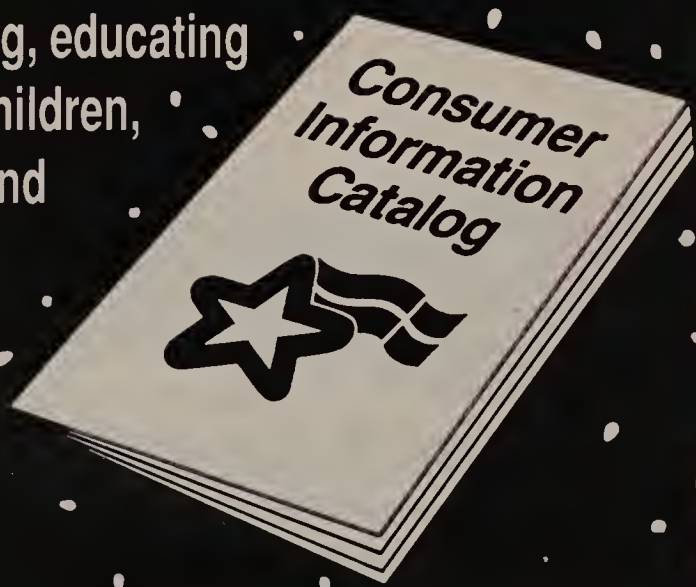
finds sentences that include all three: 4.

To eliminate words, use – or NOT. Entering `hot+java–cup` or `hot AND java NOT cup`

finds sentences 2 and 4.

MAY THE SOURCE BE WITH YOU

Don't let the dark forces of ignorance defeat you. Right in this galaxy, you can tap into the source -- the free Consumer Information Catalog. It lists free and low-cost government publications on cosmic topics such as federal benefits, jobs, health, housing, educating your children, cars, and much, much more.



So dispel the darkness and send for the source. Write today to Pueblo, Colorado for the free Consumer Information Catalog. Just send your name and address to :

Consumer Information Center
Department Source
Pueblo, Colorado 81009

A public service of this publication and the Consumer Information Center of the U. S. General Services Administration

Web Worthy

When you get results from a Web search engine, a classification and indexing program gives you a list based on its match to your search terms. But no human has looked over these results to see if they make sense, and often they don't. Search software is sophisticated, but simply not as sophisticated as you are. That's why you'll probably want to check more than one service to make sure you get something useful. The best place to start is **Infoseek Ultra** (*http://ultra.infoseek.com*).

If the results are disappointing, don't waste time trying another single search engine. Go to one of the services below, which engage several search engines at once. The logical AND construction varies by site, so check the details before doing an advanced search.

- *http://all4one.com* **all4one** gives you four search engines in their own frames on a single page, so it's the simplest metasearch service; it's also usually faster than the others.
- *http://www.metacrawler.com* A sophisticated service that's surprisingly easy to use, **MetaCrawler** takes longer than all4one to return a list, but the list includes many more search services and is nicely formatted and documented.
- *http://guaraldi.cs.colostate.edu:2000/./* This is the site for the **SavvySearch** project, which is a sort of metasearch court-of-last-resort on the Web. If your query turns up nothing from this site, what you want simply hasn't been registered with mainstream indexing services yet.
- *http://www.search.com* Still not happy? Go to clnet's **Search.Com** and try a search using one of the topical subsets (arts, education, sports, and so forth). Often the topic-specialized services have URLs that somehow haven't been indexed by the majors. You can usually search these smaller services pretty quickly.
- *http://www.designlab.ukans.edu/ProFusion.html* Finally, for do-it-yourselfers, one new, improved variation on the metasearch is available at the **ProFusion** page, which lets you click-select your own menu of search engines.

their bedrooms; the cable companies and phone companies will sort out their profit options, and most of us will get multi-megabit-per-second cable modems; and scripts that let you simultaneously search many services will become common freeware.

In that world to come, every search will be so fast and exhaustive that your biggest worry will be deciding just what and how much you need to know (your time, after all, isn't getting any cheaper). So better start formulating those carefully composed multiple-AND search queries now in self-defense. m

CHARLES SEITER is the author of *Internet for Macs for Dummies* and coauthor of *Macworld Web Essentials* (both IDG Books Worldwide, 1996) and *Yahoo Unplugged* (IDG Books Worldwide, 1995).

REACHING MACWORLD ONLINE

America Online: Keyword *Macworld*

World Wide Web: *http://www.macworld.com*

Mailing list for Macworld Live's events calendar: Send an E-mail message with **subscribe** in the subject line to: *mwlive@macworld.com*

Web Watch

Macworld

YOUR RESOURCE TO THE WORLD WIDE WEB

BoxTop Software

"GIFmation" is the first Mac video editor for creating GIF animations and the easiest tool to add motion to your web pages. GIF animations require no CGI scripts, no browser plug-ins, and no server access! They are as simple as <IMG SRC=animation.gif> and provide backwards compatibility. GIFmation™ has the most advanced features available and makes creating them a snap. boxtop@aris.com 1-800-257-6954

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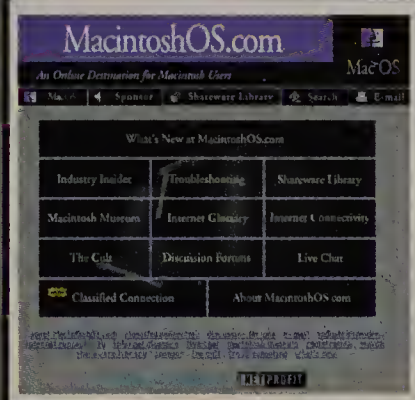
Visit Image Club's site for all your graphic design needs and more. You'll find their fresh collection of fonts, clip art and stock photos are versatile, well designed and lots of fun to use. With an easy to follow tips & tricks section and a constant supply of new, exclusive and brand name products, you'll have access to all the tools you need to create innovative design.

http://www.imageclub.com/

MacintoshOS.com



Designed with the expert and novice user in mind, MacintoshOS.com's extensive features and diverse applications provide efficient access to valuable information for every Mac user.

Download the finest Shareware applications and software, or hang-out with Mac aficionados in The Cult. Stroll through the history of Macintosh and discover the current value of your own machine in Macintosh Museum, and increase your ability to surf in the Internet's fast lane with Internet Connectivity.

More than just another page of links and superficial information, MacintoshOS.com is a complete Internet destination and is a vaulable resource for Mac users.

http://www.MacintoshOS.com/

MacSourcery

Screen Saver Factory

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Free accounting software catalog (800) 656-6299 or (415) 821-1193.

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Exciting, compelling and breathtaking are just some of the words people use to rave about our clients' web sites.

NetJet Communications builds web sites for today's innovative companies. We use the latest technologies, such as commerce servers and Java, to help our clients conduct business on the Internet in the Net Age.

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http://iaswww.com/source.html

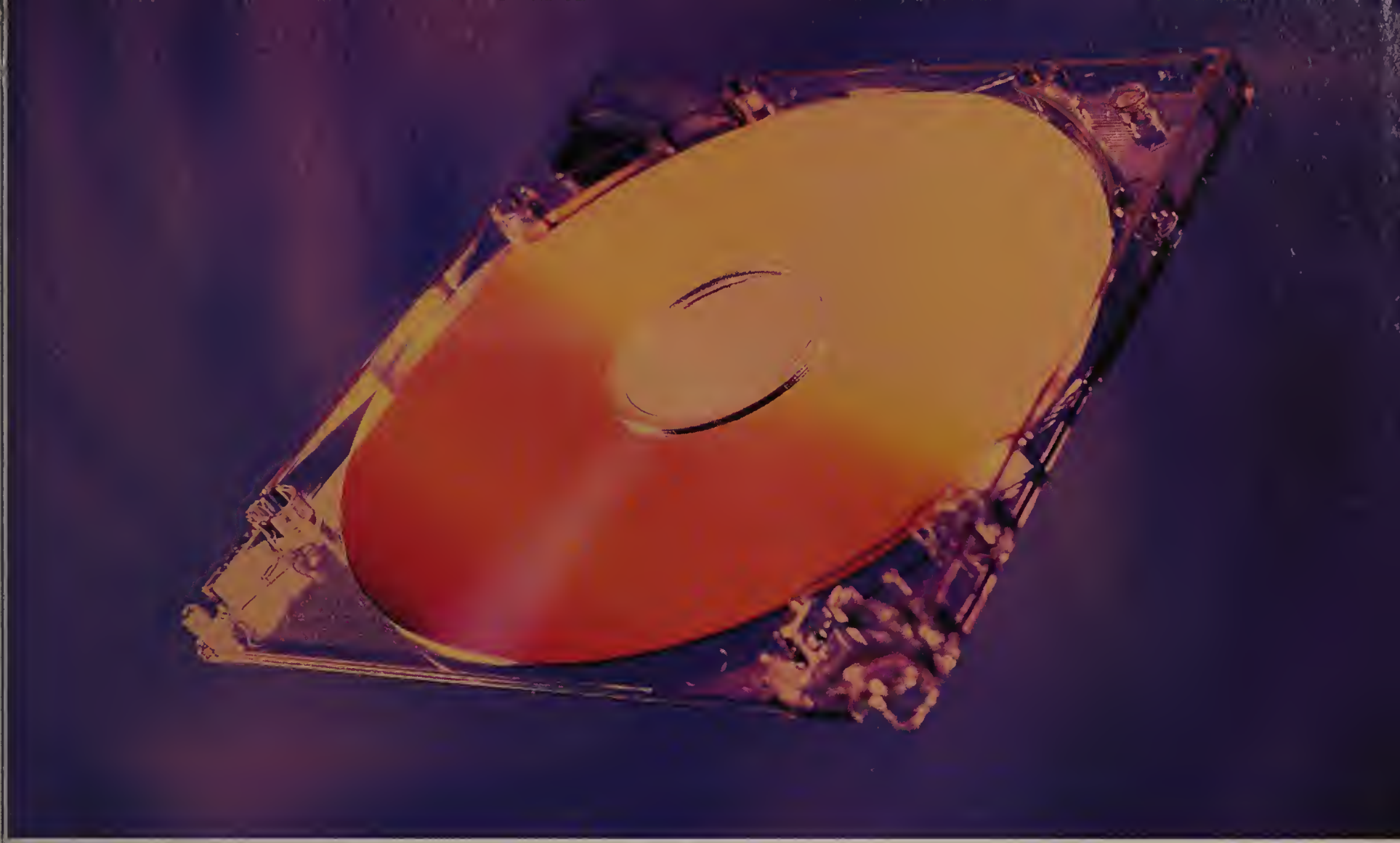
Unlike most

hard drives

it's removable.

Unlike most

removables it



Don't worry, if one cartridge fills up there are millions left.

There seems to be an unwritten rule with computers. No matter how large the hard drive, you'll eventually find a way to max it out. Unless, of course, you get one that never really fills up, right? For example, the EZFlyer™ 230, the latest removable cartridge hard drive from SyQuest.® Don't let the small 3.5 inch cartridge deceive you, this thing is huge. 230 megs that rip along at twice the speed of any removable in its class.

The reason for our blistering performance is pretty simple. It works like a hard drive because it is one. Sluggish technologies from tape drives to high-capacity floppies just can't keep up. Use the EZFlyer™ 230 the same way you would with any hard drive, with a nice little bonus–it's removable. So you can add on to your system limitlessly, 230 megs at a time, till the end of time.

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Weighing a mere 1.6 pounds, the trimmed-up drive can hit the road as well and features a self-sealing door to protect cartridges from dust and other disturbing things. When you feel the urge to change cartridges, hit the eject button and you're out of here. Applications and files stored on your cartridges are ready to run instantly. Own the Internet, throw on large chunks of video, colossal scans, the meaning of life or maybe just a CD-ROM game. Keep things you don't need. Back up things you do. It even saves money, storing your world at 10 cents per megabyte. Hmm. When you think about it, the possibilities are as endless as its capacity. Now available at Comp USA,Computer City, Best Buy and a bunch of other places. 1-800-245-2278 or http://www.syquest.com.

a hard drive.

Circle 117 on reader service card

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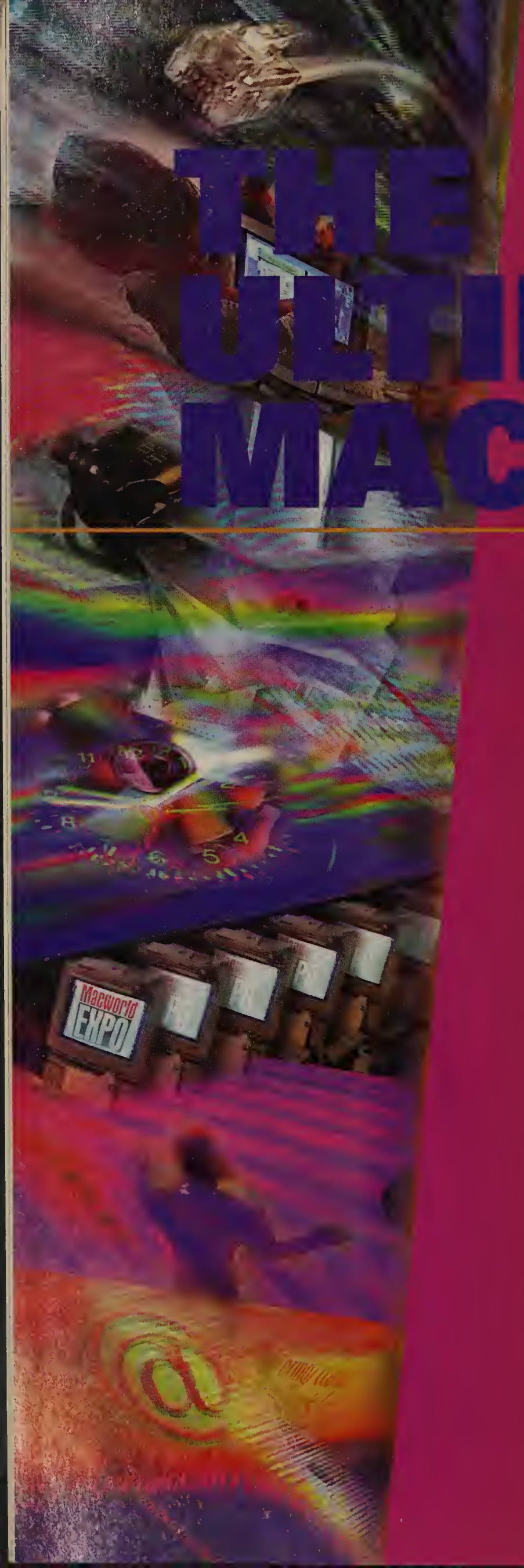


THE ULTIMATE MAC EVENT

MACWORLD EXPO SAN FRANCISCO

MACWORLD Expo/San Francisco delivers an explosion of technology as the largest Macintosh-focused event on the West Coast. It's your opportunity to explore an exhibit floor with everything you've ever wondered about... ask an expert's opinion... compare and critique hot new products... or get the buzz on the latest from industry gurus. Whether you're already sold on the Mac or wondering which way to go, MACWORLD Expo/San Francisco is the ultimate event to plan your direction.

Fast-forward your productivity with maximum-impact conference sessions at MACWORLD Expo/San Francisco. You'll get the latest tips and techniques from leading experts on today's hottest topics including the Internet and World Wide Web, plus design, publishing, illustration, animation, audio/sound/music, graphics, entertainment, multimedia, connectivity, operating systems, education, telecommuting and small office/home office. MACWORLD Expo — it's unparalleled!

REGISTER BY DECEMBER 2ND AND SAVE

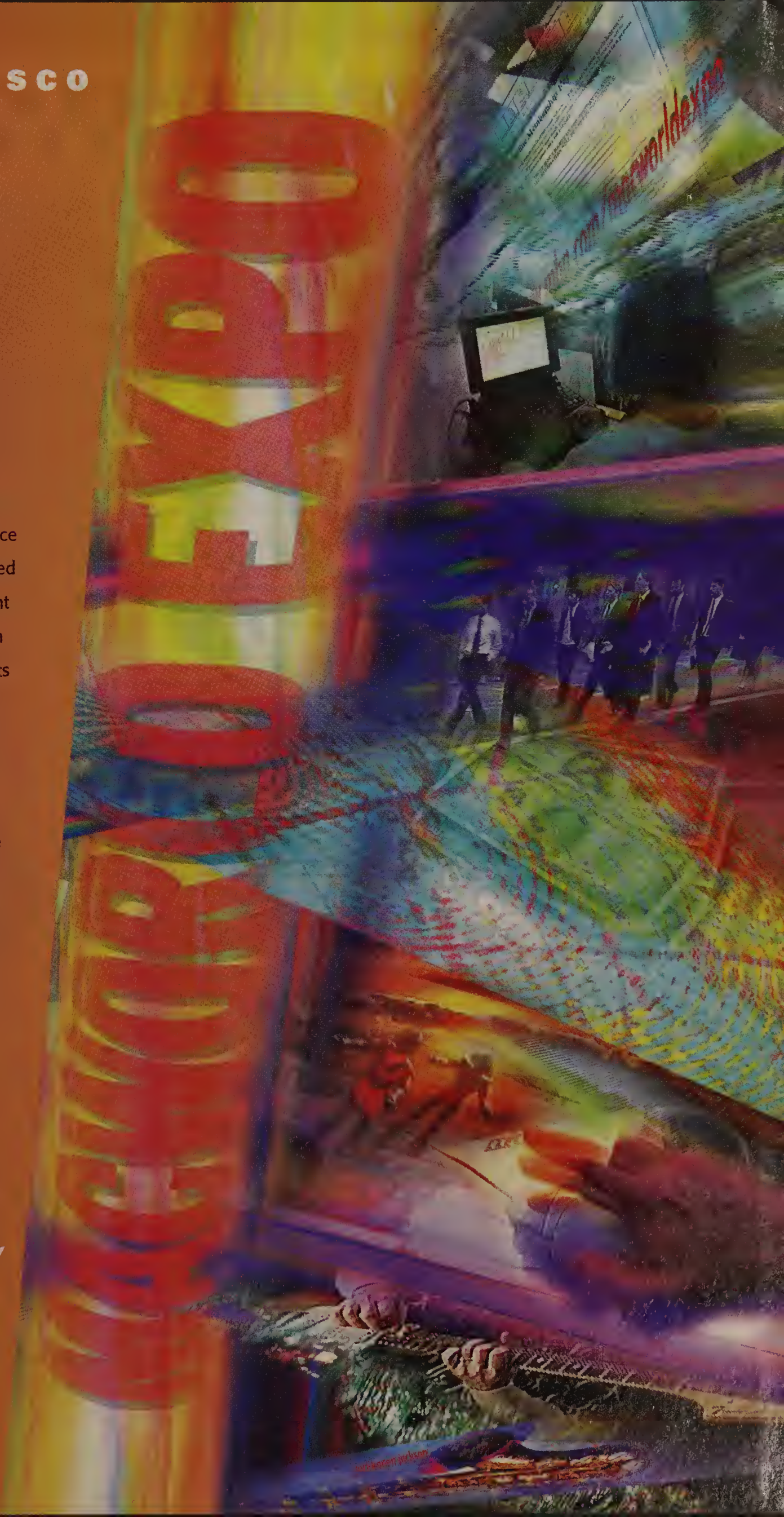
SAN FRANCISCO
JANUARY
7-10, 1997

REGISTER NOW!

Register early and you'll not only ensure your spot at this can't-miss event, you'll also save on conference and exhibit fees. Return the attached registration form with your payment by December 2nd and save $25 on all conference sessions and exhibits ($170 now vs. $195 at the door). An Exhibits-only admission saves you $15 ($25 now vs. $40 cash only at the door). All early registrants, except international, receive their admission badge in advance. If your form with payment is not received by the pre-registration deadline of December 2, you will have to register on-site.

So rather than spending your time registering on-site, you'll be spending your time with the Macintosh experts!

"Wonderful and exciting new developments. Really felt as though the speaker was sharing with us. Excellent, excellent, excellent!"



THE FUTURE-FOCUSED CONFERENCE PROGRAM

What's New? What's Hot? What's Here? What's Coming?

In a word: PLENTY. Our blue-ribbon Conference Advisory Board has launched a stellar program brimming with intensive, content-rich new sessions, along with scintillating new speakers (and most-requested favorites).

Take a look at the dozens of enabling new applications from Apple and third-party developers… see why the Mac is the premiere vehicle for Internet access and creation of content for the World Wide Web… and spend four days with Macintosh mavens who will share their most successful tips on how to animate, navigate, publish, customize, and otherwise profit from your Mac!

For a future filled with power, productivity, and profitability, it's Mac to the future… at MACWORLD Expo.

Seating at all conference sessions is on a space-available basis.

Here's a preview of the 11 separate conference tracks and individual sessions:

A. The *Macworld Magazine* Track

Macworld's editors, columnists, and featured guests present living pages of the magazine's hottest topics.

• *Macworld Magazine's* Best of Show • The Best of *Macworld* MacSECRETS • Choosing the Best Mac for Your Needs • Illustrator/Freehand/Canvas/CorelDraw Shootout! • Maximizing the New PowerBooks • Multimedia Secrets

B. The Design/Art/Prepress Track

Celebrated artist, illustrators, designers, and graphics gurus share intensely useful tips, tricks, and technology breakthroughs.

• Desktop Color Scanning • Kai's Killer Tips and Tricks • Digital Photography • Illustrator WOW! Artists • Painter WOW! Artists • Photoshop WOW! Artists • Advanced Imaging for Professionals • The Stages of a Graphic Masterpiece

C. The Web Creativity/Web Masters Track

Get a leg up on the Web (and your competition) with sessions designed to help you cruise, serve, and populate the Net. Give your business the Macintosh/Web Advantage!

• Choosing a Web Server • CGI and Database Tools Overview • Server Administration • Webcasting • New and Future Internet Technologies • Cool Web Server Tools • Building Interactivity Into Your Web Site • Publishing on the Web • Designing Graphics for the World Wide Web • Web Page Navigation and Content Structure

D. The Operating System/Connectivity Track

Learn how to maximize the Mac with the bonuses Apple threw in for free -- to upgrade your Mac so that it'll continue to perform at peak, and connect to even more powerful networks.

• Essential Network Management Tools • Apple Extensions Explained • Apple OS Update • TCP/IP Report • Clones: A User Perspective • Stump the Network Experts! • Connect Anywhere Networking (Wireless/Mobile Computing) • Dealing with OpenDoc and Cyberdog

E. The Creating Entertainment Track

For design, video, film and multimedia professionals: the increasing power of the Mac, coupled with the global reach of the Web, offer unparalleled opportunities for entertainment creation. Learn from the pros and have fun while you're doing it!

• QuickTime VR • Career Opportunities for Digital Media Artists • Audio, Sound, and Music Tools • Developing Interactive Games • Case Study: On-Air Graphics • New Worlds of Expression with Digital Video • The Mac in Cinema • Creating Multimedia Content for Online and CD-ROM • 3D Animation: Step by Step

F. The Getting-Started Track

Practical, focused, step-by-step approaches and guidelines for those who need a concentrated course of beginner's how-to's on Mac technologies and techniques.

• Online Survival Guide • Beginner's Guide to the Internet • Beginner's Guide to Publishing a CD-ROM • Intermediate Internet • Getting Started with QuickTime • Getting Started with HTML • Getting Started with Java

G. The Telecommuting & Home Office Track

Never before has it been easier -- or more fun! -- to launch a small company or home-based business. Discover the cost savings and increased productivity that can be achieved by telecommuting, as millions of Macintosh users are now doing. Hear experts share their insights on how YOU can make it happen too.

• Introduction to Telecommuting • The Joy of Working from Home • Marketing with Your Mac • SOHO on the Internet • Using the Latest and Greatest to Run Your Small Business • Small Business Success Secrets

H. The Tools Workshops

Intensive training sessions on some of the most popular Macintosh tools, presented in a totally non-biased format by the award-winning staff of MacAcademy.

• Mastering the Macintosh • Claris Works • Adobe PageMill • Adobe Photoshop • QuarkXPress • Adobe Illustrator • Macromedia Director

I. The Educator's Track

An excellent opportunity for educators, administrators, and students to show and be shown new and classic examples of how the Macintosh positively shines as a teaching tool.

• Maximizing the Mac in Education • QuickTime for Educators • Multimedia for Educators • The Internet for Educators • The Macintosh Student Showcase • Webcasting for Classrooms

J. The Special Interest Group Track

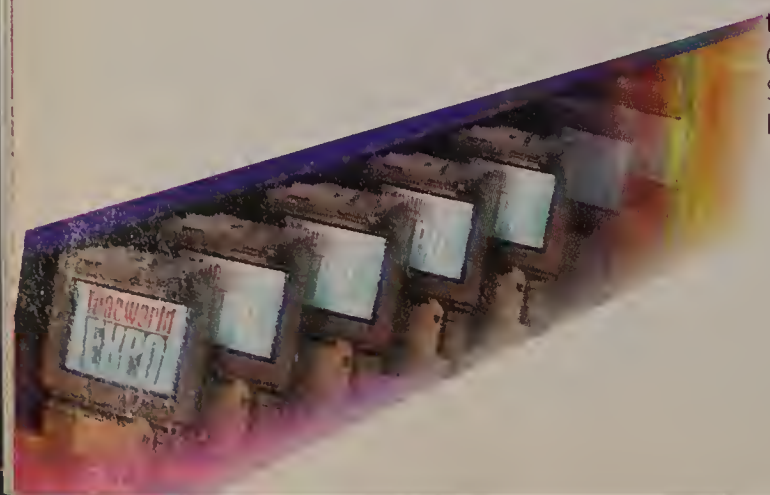
Sessions for "birds of a feather" looking to compare Mac notes with others in a similar setting – to solve special problems, to see how colleagues across the continent are getting more mileage out of the Mac, and to develop an invaluable "user network."

• Macs in the Law Office • Macs in Science and Technology • User Group Academy Presents: The Mac and Your Non-Profit

K. The You-Asked-For-It-Track

A combination of perennial MACWORLD Expo favorites, plus brand-new topics in response to your special requests, with up-to-the-minute market developments. For starters:

• Customizing Your Mac • Internet Security • Resolving System Conflicts • Cross-Platform Development • JavaScript Tips and Tricks • Intranet Insights • Newton: What Can it Do Today?



SPECIAL FEATURES

The Keynote Sessions

There will always be a Macintosh in your future! The dynamic keynotes at MACWORLD Expo/San Francisco will catapult you closer to the excitement of tomorrow's promise — while putting you in touch with the next wave of Mac technologies. More dazzling session announcements to come — but meanwhile, here's just one sneak peek:

Macintosh Coooool:
The Hottest, Coolest, Baddest New Apps for the Mac
Join Apple Fellow and Ultimate MAC Evangelist **Guy Kawasaki** for a close-up look at some of the most exciting new applications to hit the Macintosh market. Guy has personally picked a panel of companies whose products have impressed him as hottest, coolest, and/or baddest — and they're ready to deliver not only a session that will spellbind, but also a glimpse of how the future holds ever more power and productivity for your Macintosh!
Keynotes: Tuesday, January 7 • San Francisco Marriott Hotel

The Net Zone

The future of online communications is here! Enter the Net Zone and come in contact with the latest in Internet hardware/software; security and encryption; Intranet applications; cutting-edge demos; e-mail technologies; and more. Don't miss out on this opportunity to explore, sample and learn more about the world of the Internet.

MACWORLD Expo has built an extensive Conference Program featuring a multitude of sessions specific to the Internet. Fasten your seatbelt and learn how to maneuver along the superhighway!

The Pavilions: Gateways of Discovery

Developer Greenhouse™: This pavilion is a hothouse of ideas featuring the future of Macintosh software, including products for the Internet, OpenDoc and Entertainment.
Business Solution Pavilion: Explore the future of business management software products and solutions.
Education Pavilion: Sample new software and multimedia applications for every curriculum area.

UGWUMP

(User Group Welcoming/Unwinding/Meeting Place)
Exchange ideas and stories at this one-of-a-kind networking parlor for user groups. Swap newsletters, literature; learn how to start a user group in your area, and more!

MacSciTech Resource Center

Come and discuss with engineers and scientists the changes and issues dealing with how the Macintosh plays a role in chemistry, biology, computer science, design/test engineering, physics, mathematics, and more!

Developer Central

Developing applications or custom solutions? Then don't miss out on this opportunity to find the latest tools and training solutions for Macintosh and Newton development.
Attend seminars taught by the world's best Mac techies!

For more information call 800-645-EXPO or see http://www.mha.com/macworldexpo

MACWORLD EXPO/SAN FRANCISCO REGISTRATION FORM

MACWORLD Expo/San Francisco • January 7-10, 1997 • Moscone Center

1. REGISTRATION SELECTION AND FEES

❑ **Package One $170**
Conference Sessions, Exhibits and Keynote Sessions.
Pre-register by December 2nd ($195 at the door).

❑ **Package Two $25**
Admission to Exhibits only.
Pre-register by December 2nd ($40 cash only at the door).

❑ **Check if Applicable**
I'm an international attendee. Please mail my badge by Airborne Express. Enclosed is an additional U.S. $45.

❑ **Check if Applicable**
If you are disabled and require special services, please attach a written description of your needs.

Pre-Register by December 2nd and Save!

Please choose your package and fill out the form completely. Incomplete forms will be returned. One form per person; make photocopies for additional people. **Payment must accompany form for registration to be complete.** Purchase orders not accepted. **Registration forms received after December 2nd will be returned unprocessed.** This form cannot be used for on-site registration. **All registration fees are non-refundable and credentials are non-transferable.** A $20 fee will be charged for all returned checks. Confirmation of your registration will be sent to you once registration is received.
U.S. Badges: will be mailed on or about December 18.
International Badges: (including Canadian) will be held on-site at the International Badge Pick-up Counter in the North Lobby of the Moscone Center during registration hours.
Registration Hours: January 6, 11:00 a.m. - 4:00 p.m.; January 7-9, 9:00 a.m. - 6:00 p.m.; January 10, 9:00 a.m. - 4:00 p.m.

2. CUSTOMER INFORMATION

MWB

Please check one: ❑ Home Address ❑ Company Address

FIRST NAME **M.I.** **LAST NAME**

TITLE

COMPANY

STREET ADDRESS **(Please Include Apt. #, Suite, Mail Stop, etc.)**

P.O. BOX **(If Applicable)**

CITY **STATE/PROVINCE** **ZIP CODE/POSTAL CODE**

COUNTRY

TELEPHONE **EXTENSION**

FAX **INTERNET/EMAIL ADDRESS**

3. ATTENDEE PROFILE

WHAT IS YOUR INDUSTRY? (Check One Only)
❑ 1. Accounting/Finance
❑ 2. Aerospace
❑ 3. Architecture/Construction/Process Industries
❑ 4. Art/Design/Creative Services
❑ 5. Arts & Entertainment
❑ 6. Computer Reseller/VAR/VAD/Service
❑ 7. Consulting
❑ 8. Education
❑ 9. Engineering/R&D
❑ 10. Government/Military
❑ 11. Health/Medical Services
❑ 12. Legal Services
❑ 13. Manufacturing (Computer Industry)
❑ 14. Manufacturing (Non-Computer Industry)
❑ 15. Marketing/Sales/PR/Communications
❑ 16. Printing/Publishing
❑ 17. Transportation
❑ 18. Utilities
❑ 19. Other_____

WHAT IS YOUR JOB FUNCTION? (Check One Only)
❑ 20. Art Director/Graphics
❑ 21. Consultant
❑ 22. Controller/Treasurer/Accounting/CFO
❑ 23. Corporate Executive
❑ 24. DP/IS Management/CIO
❑ 25. Editorial/Writing
❑ 26. Educator
❑ 27. Engineering/Scientific/R&D
❑ 28. Human Resources
❑ 29. Management/Department Head
❑ 30. Marketing/Sales
❑ 31. Network Management
❑ 32. Professional (Lawyer, Doctor, etc.)
❑ 33. Programming/Analysis
❑ 34. Purchasing
❑ 35. Training
❑ 36. Other_____

WHAT IS THE SIZE OF YOUR ORGANIZATION?
❑ 37. Under 50
❑ 38. 50-99
❑ 39. 100-499
❑ 40. 500-999
❑ 41. 1000 & Over

WHICH PERSONAL COMPUTERS DO YOU USE? (Check all that apply)
❑ 42. Macintosh Powerbook Series/Duo Series
❑ 43. Macintosh II Series
❑ 44. Macintosh Performa Series
❑ 45. Macintosh Centris Series
❑ 46. Macintosh Quadra Series
❑ 47. Macintosh Workgroup Series
❑ 48. PowerMac
❑ 49. Newton
❑ 50. Mac clone
❑ 51. IBM PC or compatible desktop
❑ 52. IBM Laptop/Notebook
❑ 53. Other_____

HOW MANY MACINTOSH COMPUTERS ARE USED IN YOUR ORGANIZATION?
❑ 54. 0
❑ 55. 1-10
❑ 56. 11-25
❑ 57. 26-50
❑ 58. 51-100
❑ 59. 101-500
❑ 60. 501+

ARE THE COMPUTERS AT YOUR ORGANIZATION NETWORKED?
❑ 61.Yes
❑ 62. No

WHICH APPLICATIONS DO YOU OR YOUR ORGANIZATION UTILIZE? (Check all that apply)
❑ 63. Accounting/Finance
❑ 64. Agenda Minder/Scheduler
❑ 65. CAD/CAM
❑ 66. CASE Tools
❑ 67. Database
❑ 68. Desktop Publishing
❑ 69. Digital Video
❑ 70. Education
❑ 71. Graphics
❑ 72. Multimedia
❑ 73. Project Management
❑ 74. Speadsheet
❑ 75. Word Processing

WHICH (IF ANY) OF THESE SERVICES DOES YOUR ORGANIZATION UTILIZE? (Check all that apply)
❑ 76. America OnLine
❑ 77. AT&T
❑ 78. CompuServe
❑ 79. Netscape
❑ 80. Prodigy
❑ 81. Other_____

4. PAYMENT METHOD

❑ Check enclosed (make payable to MACWORLD Expo)
❑ Master Card ❑ Visa ❑ American Express **AMOUNT $** _____

ACCOUNT NUMBER

EXPIRATION DATE **CARD HOLDER SIGNATURE** (Signature necessary to be valid)

X_____

If card holder is other than registrant, please print card holder's name below:
FIRST NAME **M.I.**

LAST NAME

Payment must accompany form for registration to be complete. Purchase orders not accepted.

REGISTER NOW!

Mail to: MACWORLD Expo/San Francisco
P.O. Box 9103, Norwood, MA 02062-9103
or

Fax: 617.440.0359
(Fax registration forms must include credit card information)
Call 800-645-EXPO for more information.

(TTY) Service is available for the hearing impaired. Dial (617) 440-0366.

IMPORTANT

Don't pay twice for this event! If you fax your registration please do not mail it in as well; you will be double billed.

TRAVEL & ACCOMODATIONS

Call Event Travel Services, the official travel agency for MACWORLD Expo, at 800-361-8191, 9:00 a.m. – 7:00 p.m EST or fax ETS at 617-361-6936 to make all your travel arrangements.

ETS has obtained exclusive discounted rates from major airline, hotel and car rental agencies, just for you! These special rates are only available by contacting Event Travel Services, the official travel agency for MACWORLD Expo. Event Travel Services is ready to help with all your travel plans for this exciting event.

Accommodation Restrictions

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Media

As Seen on TV

HOW TO WORK WITHIN TV'S LIMITATIONS WHEN DESIGNING GRAPHICS

by Jim Heid

The text and images on a computer monitor may seem fuzzy compared with high-quality print, but they're guillotine-sharp compared with what appears on a television set. TV's resolution is far coarser than that of a monitor, and its *color gamut*—the range of colors it can display—is much narrower. On a TV, finely detailed, vibrantly colored graphics become a mass of vibrating lines and garish hues.

Blame it on the fifties. Pioneering television engineers and the Federal Communications Commission put their Vitalis-slicked heads together and developed the technical standards on which television is based. When color TV became a reality, the FCC mandated that broadcasters transmit a signal that black-and-white sets could still receive. This led to compromises in the video-signal–encoding technique that remain today.

Graphic designers in the television industry have learned to work within TV's limitations. But many desktop video producers haven't; they can inadvertently produce on-screen graphics and titles that not only look hideous on a television but are literally illegal: broadcasting them would create a signal that doesn't conform to FCC regulations.

These days, TV designers aren't the only ones who must take TV's limitations into account. Presentation displays and even World Wide Web terminals may be TV monitors, so TV's limitations can affect business presenters and Web-site developers. This month, I describe the issues behind designing for TV and show how some graphics and video applications make the challenges easier to face. For samples and links to more information, visit *http://www.heidsite.com/*.

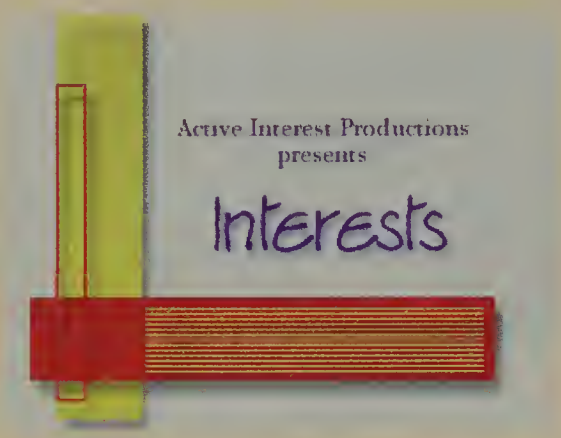
My Enemy Flicker

The electron guns inside a computer monitor paint the image's horizontal *scan lines* sequentially, from the top of the screen to the bottom. A television, however, takes an *interlaced* approach: first painting all the odd-numbered scan lines sequentially, then going back and painting the even-numbered scan lines. Each set of scan lines is called a *field*. Two fields make up a *frame*. NTSC television, the standard used in the United States, Canada, and Japan, displays 30 frames (and 60 fields) per second. (At these speeds your eye merges the two separate field images and you see a complete picture for each frame.)

TV GUIDES: Graphics Do's and Don'ts

A number of TV graphics no-no's are easy to overlook because the graphics appear to be fine on your Mac, but display them on a TV monitor and watch out. Fortunately, it's easy to avoid these pitfalls; here are a few things to consider. (I captured the TV images by outputting the title to videotape, and then digitizing that recording with a Power Mac 8500.)

Viewed on a Mac monitor, this graphic, with fine, closely spaced parallel lines, Bodoni text, and bright colors, looks fine.



Television's inferior resolution and sharpness can turn an otherwise carefully designed graphic into a headache inducer.

The thin portions of the small Bodoni characters break up. The yellow and red colors bleed into each other, creating a dark band. You can't see it here, but the horizontal lines vibrate like guitar strings. Tightly spaced concentric circles and other patterns can also flicker badly.

Legal, Safe, and Flicker-Free

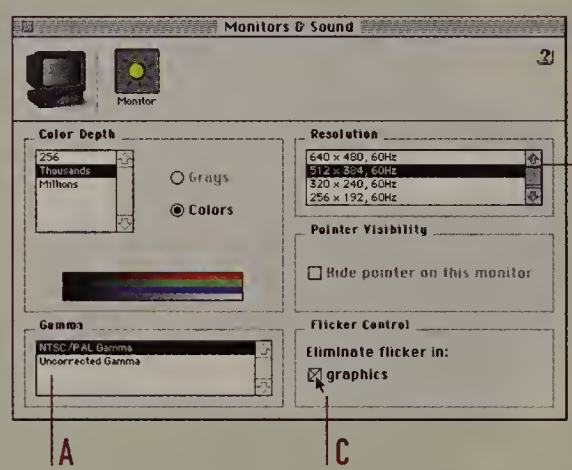
Good TV graphics use only NTSC-legal colors, fit within the title-safe zone of the TV screen, and avoid lines and patterns that cause flicker. The Power Mac 8500 and video-editing and titling programs have features that make it easier to follow both rules.

The Power Mac 8500's Monitors & Sound control panel gives you some control over the computer's NTSC output.

A. NTSC Legal The 8500's NTSC filter prevents outputting of illegal colors.

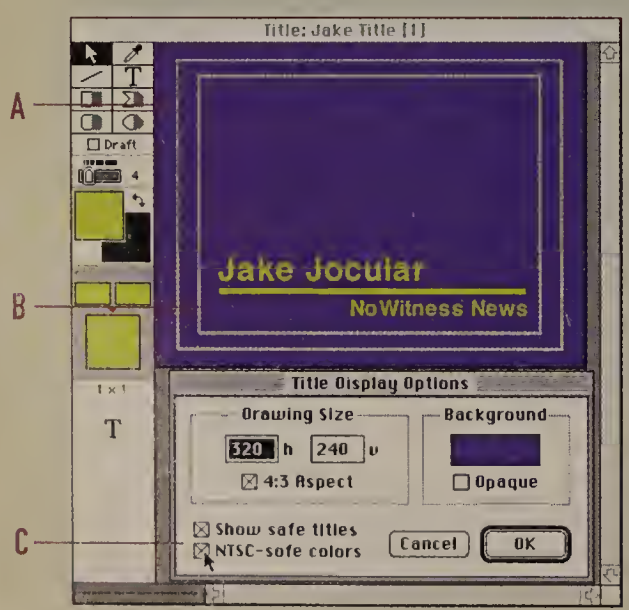
B. Title/Motion Safe Select 512 by 384 to avoid cutting off the edges of the Mac screen (an area that includes the menu bar). Select 640 by 480 for full overscan.

C. Flicker-Free The convolution filter eliminates the flicker that single-pixel horizontal lines and tight patterns can cause.



You'll get the best quality if you design graphics with legality in mind to begin with.

A. NTSC Legal Adobe Photoshop's NTSC Colors filter looks for illegal colors and automatically substitutes the nearest legal equivalent.



You can create titles in any program that supports antialiased text, but Adobe Premiere, with its safe-zone displays and its ability to warn you when a color is outside the NTSC-legal range, is particularly well-suited to the task.

To access Adobe Premiere's graphics-guideline features, activate the Title window and choose Title Options from the Windows menu. Then check the Show Safe Titles box.

A. Motion Safe All important action should be within this border.

B. Title Safe Every portion of a title or illustration should be within this border.

C. NTSC Legal To restrict colors in the title to NTSC-legal hues, check the NTSC-Safe Colors box.

D. With NTSC-Safe Colors checked, Premiere alerts you when the currently selected color is outside the NTSC-legal range. Click here to substitute the nearest safe color.

E. Premiere substitutes the nearest NTSC-legal color

Tweaking the elements to account for TV's limitations may make them look a bit bland on the Mac.

In this version, a less-glaring colored background replaces the light background, Helvetica Medium replaces the Bodoni text, muted tones replace the harsh yellow and red, and a single wide bar replaces the parallel horizontal lines. (I could also have substituted thicker, widely spaced horizontal lines.)

The revised graphic withstands the degradation imposed by the composite video signal and a fuzzy TV tube.

An interlaced display has problems with fine horizontal lines and patterns. You've probably seen weathercasters whose tacky herringbone jackets appear to vibrate. That isn't a bizarre fashion statement but an artifact caused by the pattern and the interlaced display. Similar problems surface with title type containing fine lines and even with fonts that contain thin horizontal serifs (one example is Bodoni). And on a TV the single-pixel horizontal lines in the title bar of a Mac window dance like the Rockettes.

Avoiding these problems is easy. First, no herringbone jackets. Shun lines that are only 1 pixel thick or an odd number of pixels thick. A 1-pixel line (or the "extra" pixel in lines that are an odd number of pixels thick) only appears every other frame—it seems to flicker. Even 2-pixel lines can appear to break up. Make lines plumpish and an even number of pixels thick: 4, 6, 8, and so on.

When displaying the Mac's interface on a television, you can eliminate flicker by using the *convolution filter* that most video-output devices provide. Such a filter smears single-pixel lines slightly so that they don't flicker. The Power Mac 8500 provides such an option.

Soft and Fuzzy Type

TV picture tubes aren't designed to deliver the sharp images computer monitors do. This, combined with the inherent weaknesses of the TV video signal, imposes restrictions on TV typography. The edges of characters tend to blur. If you space characters too tightly, they can appear to run together. To eliminate this, avoid excessive kerning—the text should look a bit loose on the Mac's monitor.

Also, avoid fonts with thin stems and serifs. Typefaces such as Helvetica Light are likely to appear blurry and hard to read. Faces with lots of variation between the thick and thin portions of characters will also cause problems; the thin portions will practically vanish.

For best results use a sturdy, bold face such as Helvetica Medium or Bold. For a serif typeface, Century Schoolbook works well; there's less contrast between the thick and thin portions of its characters. Avoid small type: title text should generally be no smaller than 14-point.

Color Cautions

Where color is concerned, TV's limitations stem from the design of the TV signal. In a computer monitor, the red, green, and blue video signals travel in separate wires. This is why computer monitors are often called RGB monitors.

For television, all color information is merged into a single *composite* signal. This compromise is the primary reason why televisions have a narrower color gamut than computer monitors. Specifically, TVs have trouble with bright, heavily saturated colors—brilliant reds and yellows, for example. Such colors are prone to *blooming*—spreading into adjacent scan lines—and, because of their effect on the composite signal, can even cause an audible buzzing or humming.

To avoid color problems use only NTSC-legal colors. Adobe Premiere and Photoshop provide features that make it easy to live within the law.

The Safe Zone

A computer monitor *underscans:* it avoids cutting off pixels by filling less than the entire picture tube. A television set *overscans:* it paints the image so that it bleeds off the edges of the screen. It's another blast from the past. As early picture tubes aged, the image shrank. Overscanning compensated, giving tubes a longer life.

Never place an essential element—be it a title or a bad guy—at the extreme edges of the video frame, lest it be lost. Virtually all video-editing programs provide a feature that shows the safe zone within which elements should appear.

For Best Results, See for Yourself

The best way to avoid problems when creating graphics for television is to work with a television close by. If you have a Power Mac 8500 with 4MB of video memory, you can connect an NTSC monitor and use it to proof titles and graphics as you create them (see last month's *Media* for details). If you have a different Mac, you'll need video-output hardware—a digitizing card with a video-output jack, or even a simple NTSC scan converter (see Encoder Pro and Presenter TView in *Reviews*, January 1996).

In the end, designing for TV means reining yourself in—choosing typefaces and colors conservatively and keeping TV's limits in mind. Remember: it's television; it's *supposed* to be bland. m

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Contributing editor JIM HEID's latest video productions appear on the CD that accompanies his *Macworld New Complete Mac Handbook*, fourth edition (IDG Books Worldwide, 1995).

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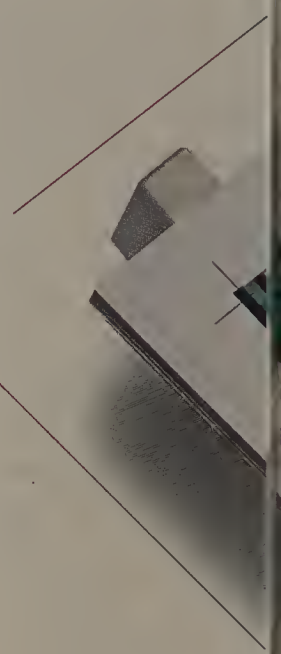

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Publishing Workshop

File Formats for Prepress

by Steve Roth

I hear this all the time: "My imagesetter output stinks, and the service bureau says it's because I used TIFF files, not EPS" (or EPS, not TIFFs—pick one). Nobody with experience uses PICT; Adobe PageMaker and QuarkXPress don't handle the format well.

I'm here to say that if you save an image from Adobe Photoshop or the like in EPS and TIFF formats, the two files contain the same image data. The differences between the two formats have to do with workflow, not image quality. TIFF files are more flexible, but EPS files offer advantages such as import speed and clipping-path support. One difference: when you include screening instructions in a Photoshop EPS file, Photoshop's screening procedure differs from standard PostScript screening, which can reduce banding in scanned images and graduated fills.

The table below details most of the differences between these formats, and how they work when imported into PageMaker or QuarkXPress. But before you jump down there, let's clarify a few issues.

- This column has nothing to do with optimizing graphics for the Web.
- I'm talking about color bitmaps (RGB or CMYK). Object-oriented images from Macromedia FreeHand, Adobe Illustrator, and the like are best off in EPS format (TIFF doesn't know from objects).
- JPEG is both a compression method and a file format. An image saved in JPEG format acts pretty much like a TIFF file in PageMaker or QuarkXPress. The exception: JPEG's "lossy" compression method trades some image quality for hefty compression.

You can also save EPS files with JPEG compression/encoding (not to be confused with the option of including a low-resolution JPEG *preview* in the EPS; see "Part of the Picture"). Choosing between JPEG and JPEG-encoded EPS is, yet again, a workflow decision. With a JPEG file, your Mac must decompress the image every time you print. With a JPEG EPS, you save a lot in network transmission time when you print, because you're sending the

Image File Format Pros and Cons for Page Layout

The issues below highlight the ways image file formats affect workflow in PageMaker (PM) and QuarkXPress (QX).

	TIFF and JPEG	EPS and DCS
File Size	Uncompressed TIFFs are about 80 percent the size of EPSs. JPEG size depends on the image's complexity and compression (compression ratios range from 4:1 to 100:1).	EPSs are 25 percent larger than TIFFs (JPEG-encoded EPSs can be much smaller). Previews can add file-size overhead.
Page-Preview Control and Display Speed	QX and PM create low-res previews when importing TIFFs and JPEGs. You can control preview size via preferences, affecting display speed, quality, and publication file size. QX: You can control preview bit depth (8, 16, or 32 bits). Surprisingly, 32-bit previews display up to three times as fast as 8-bit. PM: You can control preview resolution (you can also switch to full-resolution mode). Preview resolution can alter display speed by a factor of eight or more.	The preview is built into the EPS, and imported as is. QX: With 8-bit EPS previews, display speed is equivalent to 32-bit TIFF previews; JPEG-encoded EPS previews take two to six times as long as other previews to display. PM: With 8-bit EPS previews, display speed is equivalent to that of low-res TIFF previews; JPEG-encoded EPS previews take up to ten times as long to display.
Page-Preview Quality	Depends on import settings—from garbage to quite good. QX's 8-bit previews are worse than EPS 8-bit previews from Photoshop. QX's 32-bit previews equal JPEG-encoded EPS previews. PM's previews from TIFFs generally look better than Photoshop's 8-bit EPS previews, worse than JPEG-encoded EPS previews. With high-res previews or in full-resolution display mode (slow!), PM previews equal JPEG-encoded EPSs.	Depends on the preview built into the EPS. 8-bit EPS previews are chunky; JPEG EPS previews are quite good. Previews in CMYK EPSs have much better color accuracy than those built from CMYK TIFFs (unless a well-set-up color-management system generates the preview).
Import Speed	Depends on file size, compression, display preferences, color-management settings, computer. A 2MB uncompressed RGB TIFF generating a 512K preview on a 66MHz PowerPC 601, with color management turned off, takes roughly 10 seconds.	Because the low-res preview is built into the EPS file, import is almost instantaneous.
Image Control: Tonal Correction, Filters, and Halftone Screens	You have control for gray-scale and line-art images. QX: For individual color images imported with 8-bit (but not 16- or 32-bit) previews, you can control tonal correction, but not screening. You can run filters with third-party XTensions. PM: You have no control for color images; you can run Photoshop filters.	No image control, no filters. For screening (for duotones, for instance) you must include instructions in the file when creating it.

compressed file over the wire. But the printer must decode the image (which also takes time), and you're limited to PostScript Level 2 printers (the only ones that know how to decompress JPEG). The biggest problem with JPEG-encoded EPS files, though, is that PageMaker and QuarkXPress can't produce color separations from these files.

• A DCS (desktop color separation) file is a variety of EPS, and there are actually two types of DCS—*single-file* and *five-file*. Single-file DCS puts all four CMYK layers in the file. Five-file DCS consists of a low-res composite file with pointers to four separate high-res files—for C, M, Y, and K (more, if you use a varnish or PMS ink).

With those concepts in mind, use the table to create the most efficient system for your production workflow. ■

Contributing editor STEVE ROTH, president of Thunder Lizard Productions, can be reached at *steve_roth@macworld.com*.

PART OF THE PICTURE: Page Previews

Several interrelated factors affect the previews you see on your pages, and what you have to live with to see them. The following examples of previews from RGB image files highlight some of the ways previews can affect your work.

EPS with Previews from Photoshop

YOU CAN INCLUDE VARIOUS low-resolution previews in an EPS file; PageMaker and QuarkXPress use them for on-page display. The two most common embedded previews are 8 bit (256 colors) and JPEG (compressed 24-bit color).

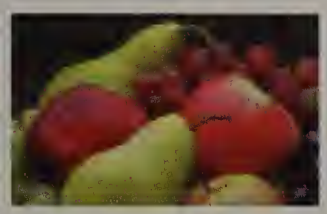
The JPEG preview looks great, but there's a huge hit on display speed in QuarkXPress and (especially) PageMaker. The 8-bit preview is not gorgeous, and unlike with on-screen previews created for imported TIFF images, there's no recourse to a higher resolution or bit depth. But 8-bit previews are small, so your publication doesn't balloon in size, and PageMaker and QuarkXPress import and display them quickly. Bottom line: you can get equivalent display quality, better display speed, and more flexibility with TIFF.

8-bit

JPEG

Previews Created by QuarkXPress from TIFFs

8-bit



32-bit

XPRESS'S 32-BIT PREVIEW is equivalent to a JPEG preview from an EPS file, and display speed is tops. The 8-bit preview looks worse and (paradoxically) displays much more slowly, but it keeps the publication file size down.

Previews Created by PageMaker from TIFFs

32K

256K

EVEN THE LOW-RES PREVIEW is better than an 8-bit EPS preview, and it displays quickly. The higher-resolution preview looks about as good as an EPS JPEG preview, but it displays quite slowly. The advantage here: you can opt for a very low-res preview, and switch to PageMaker's full-resolution display when you need it.

	TIFF and JPEG	EPS and DCS
Duotones	TIFF and JPEG don't support duotones.	EPS and DCS support spot-color duotones.
Cropping	QX and PM send just the image data inside the cropped area for printing, which can speed printing a lot.	QX and PM send the whole image, regardless of cropping—a big printing-speed hit if you're profligate in cropping large images.
Clipping Paths	Photoshop TIFFs (not JPEGs) can include clipping paths. QX: Doesn't support clipping paths in TIFFs. PM: Supports clipping paths in TIFFs. Automatically crops to bounding box of clipping path on import.	EPS and DCS can include clipping paths.
Color Management	You have full control of QX's and PM's color-management features.	You can't use QX's and PM's color-management features.
Compression	You can compress TIFFs with LZW (non-lossy compression). JPEG files use lossy compression by definition.	JPEG is your only compression option (JPEG-encoded EPSs must be printed on Level 2 PostScript devices).
Separating RGB Images	You can use QX's and PM's color-management features to convert RGB TIFFs to CMYK for four-color output.	You have few and limited solutions for converting RGB EPS files to CMYK.
Printing Separations of CMYK Images	QX and PM send only 8 bits of data to printer for each color channel, so output is faster.	QX and PM send 32 bits per channel for single-file DCS (slow!), 8 bits per channel for five-file DCS; can't separate JPEG-encoded EPSs. QX version 3.32r2 can pull apart single-file CMYK EPSs created with Photoshop 3.0X, sending only 8 bits per channel.
Downsampling for Proof Printing	You can reduce image resolution for low-screen-frequency proofing to speed printing (a lot!). QX: Sends downsampled data automatically and invisibly. PM: Select Optimized in Print Options dialog box to send downsampled data for printing.	You can't downsample for proof printing.
PostScript-Generation Speed	Depends on a variety of factors: file size, compression method, color management, computer speed.	No processing required, therefore much faster than TIFF or JPEG
PostScript Printing Speed	Same as EPS.	Same as TIFF, except with JPEG-encoded EPSs, which require decompression by the printer.

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Graphics Workshop

Extracting Optimum Detail in Scanned Photos

by Cathy Abes

ARTIST Jim Rich is a consultant specializing in publishing and prepress training, based in the Washington, D.C., area. The coauthor of *Photoshop in Black and White*, second edition (Peachpit Press, 1995), he has more than 25 years of experience using imaging applications.

HOW IT WAS DONE Photoshop offers numerous methods for enhancing scanned images—both color and black-and-white; the trick is knowing which ones work best on the flaw you're trying to fix. This stock photo proved a good vehicle for Rich to demonstrate some useful techniques for pulling out hidden details in a gray-scale image.

Rich began by making a feathered selection around the dark area of the right arm. He was able to lighten the dark areas using the dodge tool. Experimenting with different exposures and brush sizes was necessary to make the corrected area look natural.

If you go too far with the dodge tool, you can undo by using either the Erase to Save option of the eraser or the rubber-stamp tool to paint back as much of the original as you want.

To correct the corset, he selected the too-light area and used the Take Snapshot feature to paint in details.

Some areas, such as the right hip, were too light to be repaired easily. Rich found that none of the techniques that worked on the other areas proved successful here.

TOOLS **Hardware:** Power Mac 8100AV with 96MB of RAM, internal 1GB hard drive, external 1.7GB hard drive, PixelCraft 4000 flatbed scanner, Apple 15-inch color monitor, Seiko S2II 15-inch color monitor. **Software:** Adobe Photoshop 3.0.5. m

1 The original raw scan of the photo shows overexposed and underexposed areas that need correcting.

2 After selecting the woman's right arm with an 8-pixel feather, Rich used the dodge tool with a midtone setting and a 200-pixel soft-edged brush with a variety of exposures between 40 and 80 to lighten the black areas.

3 He was able to lighten the too-dark areas of the left arm by making a selection and adjusting Curves just for those areas.

6 Using the Paint From Saved option allowed him to lighten up the overdarkened areas. Finding the right balance between light and dark involved alternating between the From Saved and From Snapshot options at different opacities until he finally achieved the desired effect.

4 After using Curves to increase the midtone density areas by about 30 percent in the too-light corset, Rich took a snapshot of the image and then undid the Curves adjustment. Choosing the rubber stamp's From Snapshot option, Rich was able to extract details from the corset with a large, soft-edged brush at 70 percent opacity by painting from the snapshot, but it still wasn't enough.

5 So he tried painting in the corset using the From Snapshot option at full opacity, only to find that this darkened the area too much.

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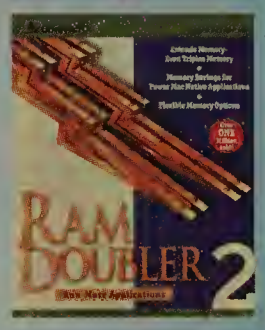

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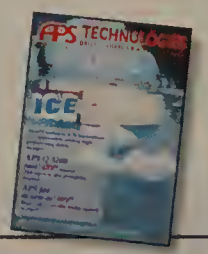

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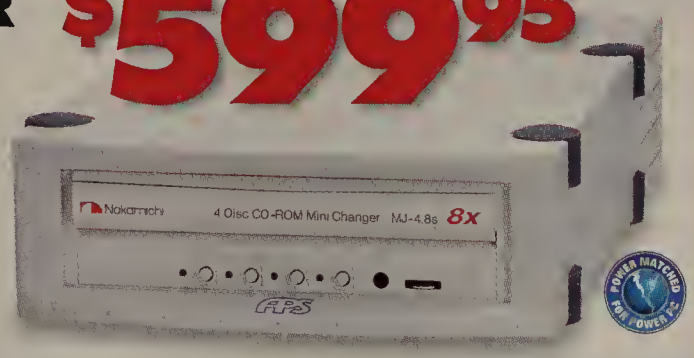

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Model	Capacity/Awards	Internal	SR 2000
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APS Q 2100 Quantum Fireball TM	2100MB	349.95	449.95
APS Q 3200 Quantum Fireball TM	3200MB	499.95	599.95

APS HIGH-PERFORMANCE DRIVES

Model	Capacity/Awards	Internal	SR 2000
APS I 2160 IBM Ultrastar ES Now ULTRA SCSI	2063MB	$399.95	$499.95
APS MS 4.0 Micropolis 3243	4064MB MacUser ZD LABS 4½	899.95	1099.95
APS MS 9000 Micropolis 3391	8669MB	1899.95	1999.95

Fast/Wide available for an additional $100.00

APS QIC & DAT BACKUP SYSTEMS

Model	Capacity/Awards	Internal	SR 2000
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APS ProDAT® DDS-2 Non Compression Mech.	4GB	$649.95	699.95
APS HyperDAT® Pro DDS-2 High Speed Mech.	8GB	949.95	999.95

APS REMOVABLE DRIVES

Model	Capacity/Awards	SR 1000	SR 2000
APS M540	500MB	N/A	$299.95
APS Jaz w/1 cartridge	1GB	$499.95	499.95
APS Jaz w/4 cartridges	1GB	599.95	599.95

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Model	Capacity/Features	SR 1000	SR 2000
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APS 640MB MO	640MB		599.95
APS 2.6GB MO	4MB cache MacUser ZD LABS 3½		1799.95

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The Best Engineering – Motorola

- Motorola – manufacturer of the PowerPC processor – No one knows it better
- *M·Power* takes advantage of Motorola's quality processor technology, innovation & reliability

The Best Service and Support

- *M·Power* comes from the company you've known and trusted for years
- *M·Power* has the backing of APS' award-winning service and support

Exceptional Value

- Best mix of advanced processor technology and high-quality hardware
- Compared with other personal computers running Mac OS, APS' *M·Power* gives you the most for your money

Most Configuration Options

- APS, the recognized leader in Mac data storage solutions, has the hardware that you want included with your next Mac OS system – hard drives, removable media devices and tape backup systems

Build It Your Way!

- Get all of the hardware you want, and have it custom assembled by APS' knowledgeable staff

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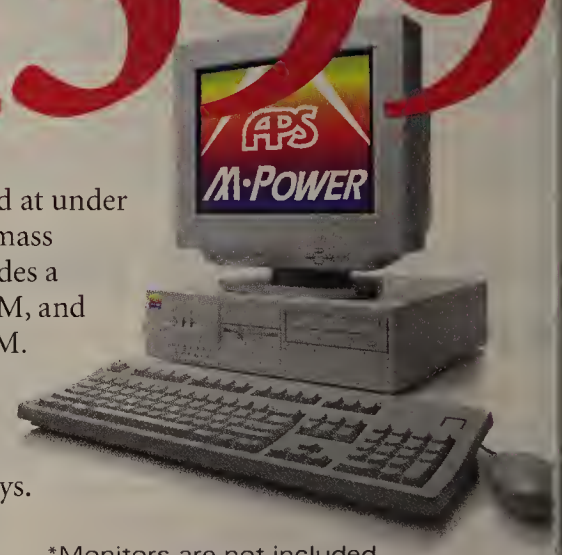
- THE best value in PowerPC Computing!
- 160MHz Motorola PowerPC 603e processor
- 16MB of RAM
- Three available PCI slots and three open 3.5" drive bays
- 1.2GB hard drive • 8X CD-ROM

The APS *M·POWER* 603e160 is the new benchmark in PowerPC, Mac OS computing. Priced at under $1400, this is the absolute value leader in RISC-based workstations. This perfect home or mass application PowerPC computer includes a 1.2GB hard disk drive, an 8X CD-ROM, and 16MB (upgradable to 160MB) of RAM. The APS *M·POWER* 603e160 also includes a mouse and extended ADB keyboard, three PCI expansion card slots, and three available 3.5" drive bays. One-year limited warranty.



*Monitors are not included.

603e160

- 2-5.25" Internal Bays
- 3-3.5" Internal Bays
- 3-PCI Expansion Card Slots

INTERFACES

- Printer Port
- Modem Port
- ADB Port
- SVGA Monitor Port
- Supports 14", 15", 17" & 21" Monitors
- SCSI Port
- 16-bit Sound Output Port
- Rear Headphone Jack
- Microphone Jack

INCLUDES:

- 8x CD-ROM
- 16MB RAM
- 1.2GB HD
- Floppy Drive
- 1MB VRAM
- ADB Keyboard & Mouse
- One-Year Limited Warranty
- Desktop Case

COMPARISON

	5.25" Intl. Bay's	3.5" Intl. Bay's	PCI Expansion Slots	Printer Port	Modem Port	ADB Port	ADB Keyboard & Mouse	PS/2 Ports	SVGA Monitor Port	Supports 14", 15", 17" & 21"	SCSI Bus	IDE Bus	16-bit Sound Output Port	Rear Headphone Jack	Microphone Jack	8X CD ROM	Hard Drive (GB)	EDO RAM	L2 Cache	VRAM (MB)	Floppy Drive	Price
APS 604e200 Tower Case	3	4	5	✓	✓	✓	✓	2	✓	✓	1†	✓	✓	✓	✓	✓	2.5	24	512K	2	✓	$2599
P.C. POWERTOWER 200e Tower Case	3	2	3	✓	✓	✓	✓	-	✓	✓	1	-	✓	✓	✓	✓	2	16	1MB	2	✓	$3595
PowerMac 9500/200 Tower Case	1	2	6	✓	✓	✓	✓	-	✓	✓	2	-	✓	✓	✓	✓	2	32	256K	2	✓	$4899

Comparison information for Power Computing taken from http://www.powercc.com
Comparison information for Apple taken from Apple ads and documentation

†Internal and external acces:

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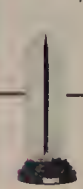
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- Blazing Fast 200MHz PowerPC 604e processor
- 2.5GB hard drive • 8X CD-ROM • 24MB of RAM
- Five PCI slots and five available drive bays

Blinding speed and exceptional value set this high-performance PowerPC, Mac OS workstation firmly at the top of the heap. The APS *M·Power* 604e200 comes equipped with a gigantic 2.5GB hard disk drive, an 8X CD-ROM drive, and 24MB of RAM (upgradable to 160MB of EDO DIMM RAM) – and that's just for starters! Turbocharged with 2MB of VRAM and 512K of Level 2 cache, the APS *M·Power* 604e200 includes five PCI slots for video, networking, peripheral expansion and other PCI-based cards. The roomy mini-tower design includes five available drive bays for optimal customization of the high-end *M·Power* 604e200. One-year limited warranty.

*Monitors are not included.

604e200

- 4-5.25" Internal Bays
- 3-3.5" Internal Bays
- 5-PCI Expansion Slots

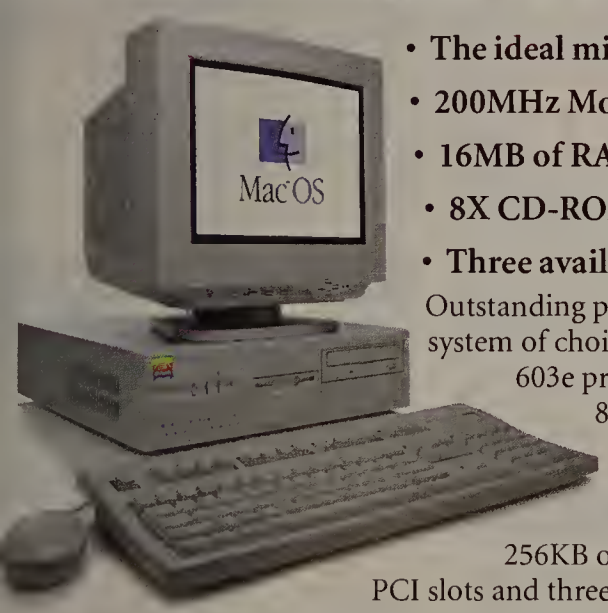
INTERFACES

- Printer Port
- Modem Port
- ADB Port
- Supports 14", 15", 17" & 21" Monitors
- SVGA Monitor Port
- SCSI Port
- 16-bit Sound Output Port
- Rear Headphone Jack
- Microphone Jack

INCLUDES:

- 8x CD-ROM
- 24MB RAM
- 2.5GB HD
- Floppy Drive
- 2MB VRAM
- 512K L2 Cache
- ADB Keyboard & Mouse
- One-Year Limited Warranty
- Mini-Tower Case

APS *M·Power* 603e200™ $1599*



*Monitors are not included.

- The ideal mix of performance and value
- 200MHz Motorola PowerPC 603e processor
- 16MB of RAM • 1.2GB hard drive
- 8X CD-ROM
- Three available PCI slots and three open 3.5" drive bays

Outstanding performance at a terrific price, the APS *M·Power* 603e200 is the bang-for-the-buck system of choice for individual and institutional users alike. Powered by Motorola's 200MHz PowerPC 603e processor, the APS *M·Power* 603e200 comes ready for action with a 1.2GB hard drive, and 8X CD-ROM. Run most applications in the installed 16MB of system RAM (upgradable to 160MB) and enjoy the exceptional performance afforded by the 256KB of Level 2 cache and 1MB of VRAM. Three PCI slots and three available 3.5" drive bays let you add a whole range of PCI card and peripheral options. With the included mouse and extended ADB keyboard, this is the value-priced performance system of choice. One-year limited warranty.

603e200

- 2-5.25" Internal Bays
- 3-3.5" Internal Bays
- 3-PCI Expansion Slots

INTERFACES

- Printer Port
- Modem Port
- ADB Port
- SVGA Monitor Port
- Supports 14", 15", 17" & 21" Monitors
- SCSI Port
- 16-bit Sound Output Port
- Rear Headphone Jack
- Microphone Jack

INCLUDES:

- 8x CD-ROM
- 16MB RAM
- 1.2GB HD
- Floppy Drive
- 1MB VRAM
- 256K L2 Cache
- ADB Keyboard & Mouse
- Desktop Case

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M540	249.95	____.__	MEMORY					
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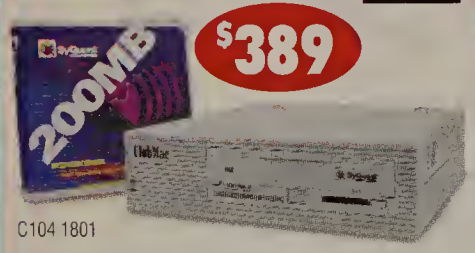

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S198 1014	270M8	$57ea	$56ea	$55ea
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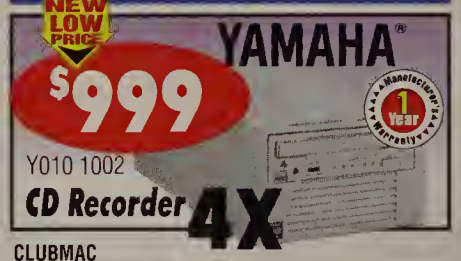

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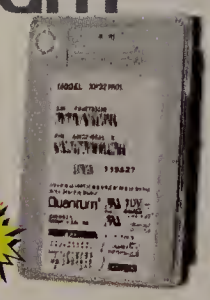

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300 1044 10/100BT Adapter PCI $180
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300 1058 10/100BT Adapter PDS $275
300 1046 100Base-T Hub 12 port fast hub $1239
ARALLON
010 1043 Farallon Fast 10/100 Card Nubus $239
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010 1032 Farallon 10BT Starlet 4 Hub $105
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010 1054 Farallon Netopia ISDN Modem $295
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D10 1027 ArtPad II 4x5 w/Dabbler $149
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D10 1029 ArtZ II 12x12 $425
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Plextor	6X	$1599	$2789
Philips	8X	$1359	$2389
NEC	8X	$1459	$2519
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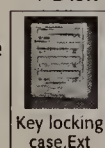

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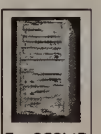

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2147MB	9ms	5400	Seagate	ST32155N	5	$489	$549
2147MB	8ms	7200	Seagate	ST32550N	5	$669	$729
4290MB	8ms	7200	Seagate	ST15150N	5	$999	$1059
9080MB	11ms	5400	Seagate	ST410800N	5	$1779	$1879
9100MB	9ms	7200	Seagate	ST19171N	5	$Call	$Call
WIDE SCSI							
2150MB	9ms	5400	Seagate	ST32155W	5	$559	$689
2147MB	8ms	7200	Seagate	ST32550W	5	$789	$919
4294MB	8ms	7200	Seagate	ST15150W	5	$1099	$1229
9080MB	11ms	5400	Seagate	ST410800W	5	$2029	$2219
9100MB	9ms	7200	Seagate	ST19171W	5	$Call	$Call

• IDE HARD DRIVES •

IDE	Speed	RPM	Brand	Model	Wty	Price
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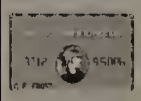

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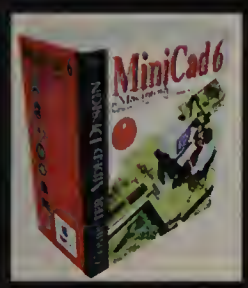

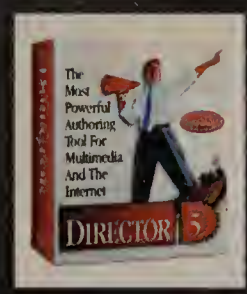

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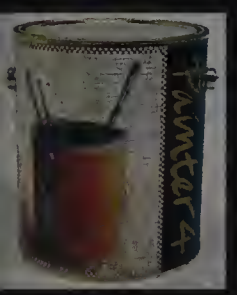

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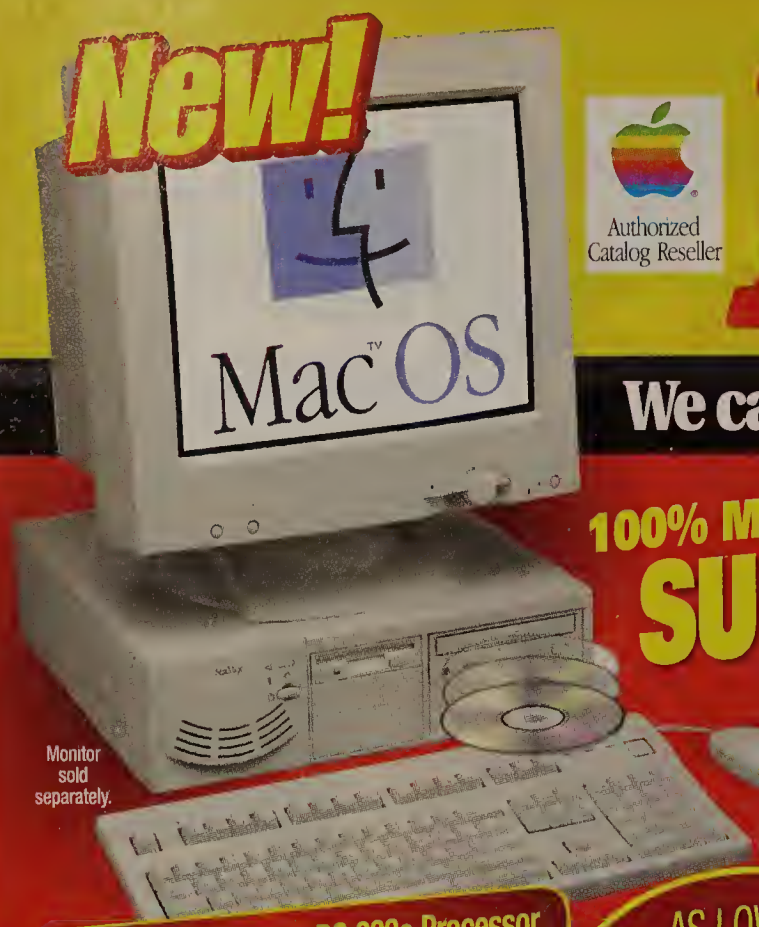

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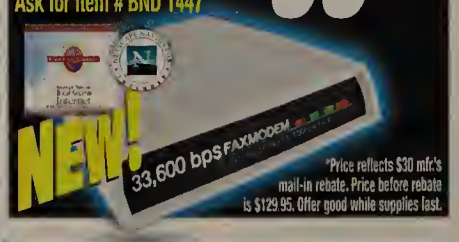

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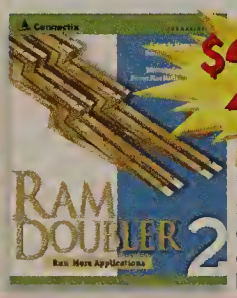

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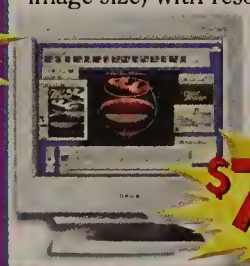

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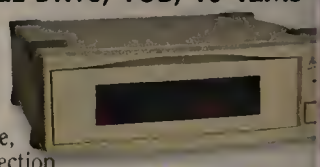

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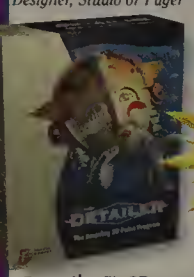

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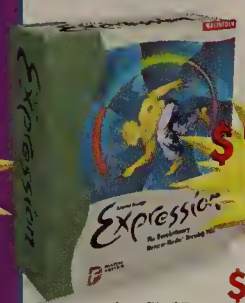

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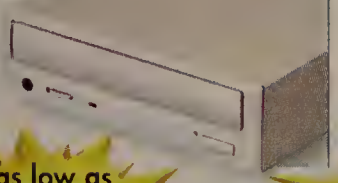

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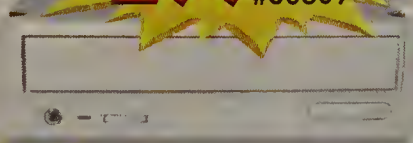

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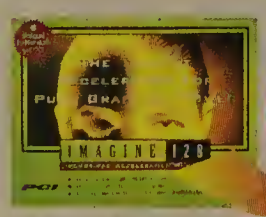

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MAG Technitron DX700T
17" Trinitron with super fine .25mm CRT. Supports resolutions up to 1280 x 1024. (Viewable 16.0")

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Portrait Display 17" Pivot
- Resolutions up to 1024 x 768
- Razor sharp 0.28mm Dot Pitch

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We know our products & understand your applications. No order-takers here.

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Call toll-free for as long as you own your Mac.

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We carry only the best products available that we've evaluated for quality.

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Fast, Easy Lease Approvals!

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Apple, the Apple logo, Macintosh, Macintosh Quadra and Power Macintosh are trademarks of Apple Computer, Inc. Prices are subject to change without notice. Mac pricing based on purchase of CPU with monitor. "Stand Alone" CPUs may be more. All returned orders may be subject to a 15% restocking fee plus return shipping. Call for RMA before returning. Software, unless defective, cannot be returned after it has been opened. *Lease prices based on 36 month term with 10% purchase option. Call for complete details.

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Power Macintosh 7200/120
16MB RAM, 1.2GB HD, 8X CD-ROM drive, Level 2 cache.
Monitor & keyboard sold separately.

- *Add 15" Trinitron Display*
- *Extended Keyboard*

Complete system price $2,799
Lease for only $94/month*

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Power Macintosh 8500/120
16MB RAM, 1GB HD, 4X CD-ROM drive, Level 2 cache, 24-bit video input & output.
Monitor & keyboard sold separately.

- *Add 17" Trinitron Display*
- *Extended Keyboard*

Complete system price $3,629
Lease for only $129/month*

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Internet Connection Kit
with any purchase! Offer expires 11/30/96.
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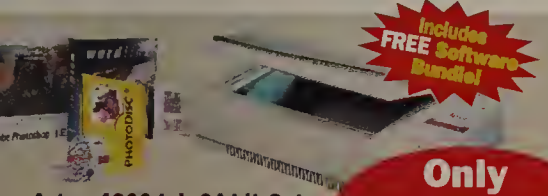

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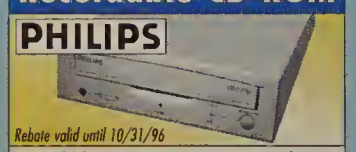

Rebate valid until 10/31/96

Philips CDD2010/40
External CD-ROM Recorder
•2x write/4x read •Includes Corel CD Creator, SCSI cord/cable, two blank disks, terminator, boot floppy
$699.95 reg. price
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Turtle Beach Internal 2Xwrite 4Xread (TBS 2040R) $849.95
Micronet 2X Recordable CD-ROM (MNT MCDPLUS) $1099.95

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Iomega Zip™ 100MB Drive for Mac/PC
•Expand your hard drive, take it with you, back it up, or do all three •Unlimited storage on inexpensive 100MB disks •Plug-and-play set-up •Comes with a SCSI cable and one 100MB removable disk •For Macintosh and PC desktops that require SCSI
$199.95 (BER ZIP100SCSI)

Spare Zip Disk 10-Pack (Mac) (BER ZIP100TENPK) $149.95

"Triple Your Stuff"

When you buy an Iomega Zip Drive, get either a **$50 Mail-in Rebate**, OR **$150 value** "Game Pack-to-Go" Bundle that contains:
1) Deluxe Carrying Case
2) Iomega Triple Stuff Game Pack, cool bundle of some of the hottest games on the market

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1) Two Zip Caddies to hold Internet downloads
2) Offline web & multimedia organizer software

(offer expires 1/31/97)

NEW LOW PRICES!

Iomega External Jaz™ Drive
•Jaz cartridges are available in either 540MB or 1-gigabyte capacity •Fast 6.73MB per second maximum sustained transfer •17.5ms average access time •Portable (so small it fits in your hand), it weighs only 2 pounds •Easy to set up and operate •For SCSI interfaces •Comes with one 1-gigabyte cartridge •For Mac or PC
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16MB (PNY 16MEG-05) .. $169.95
32MB (PNY 32MEG-05) .. $299.95

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MiroMotion DC20
•Full-screen and full-motion digital video editing system •Studio quality digitization •Compatible with all video standards •Full S-video with PCI technology •JPEG compression
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Matrox 4MB MGA Millennium (MOX 4MBPOWERMIL) $269.95
Matrox 8MB MGA Millennium (MOX 8MBPOWERMIL) $439.95

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PrecisionColor 8/1600
•Fast, super resolution graphics card gives you productivity gains with business applications at a cost-effective price •1600 x1200 @ 8-bits, 832 x 624 @ 24-bits
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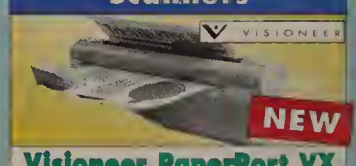

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Mac Scanner & Copier
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Microtek E3 Color Scanner (MTK SCANE3) $299.95
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PanaSync™ S17
17" Digital Color CRT Display
•0.27mm dot pitch •1,280 x 1,024 maximum resolution NI •MPR-II certified •DQ-QAF electron gun •Power-saving •3-year parts/labor
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Portrait Pivot 1700 17" Monitor (PDL M1716-02) $999.95
Sony GDM-17se-IIT 17" Monitor (SON GDM17SE-IIT) $969.95
Sony CPD-20sf-II 20" Monitor (SON CPD20SF-II) $1649.95

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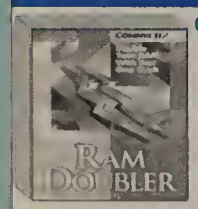

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RAM Doubler (2.0)
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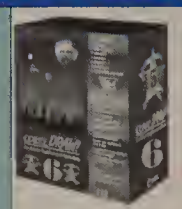

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Draw Suite (6.0) upgrade
$139.95

Home Page $89.95
Claris Organizer (1.0.3) $44.95
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QuickBooks (4.0) ... $119.95
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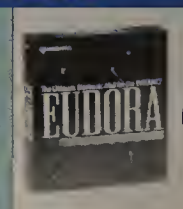

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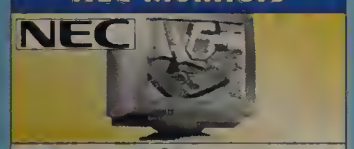
NEC Monitors



NEC MultiSync C500
15" Color Monitor
•Flat square screen •13.8" viewable image size •0.28mm dot pitch •Anti-static coating •1280 x 1024 non-interlaced PC resolution @ 60 to 76Hz, 1024 x 758 Mac res @ 75Hz

$369.95 (NEC C500)

NEC MultiSync C400 14" Monitor (NEC C400) $284.95
NEC XV15+ 15" Digital Monitor (NEC XV15+) $469.95
NEC M500 Multimedia Monitor (NEC M500) $499.95

SyQuest syjet 1.3GB

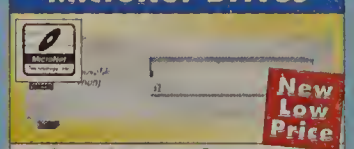
External Hard Drive with Removable Disk Cartridge

•1.3GB capacity per cartridge for virtually limitless, flexible storage •Less than 12ms average seek time •Auto eject button •Small and lightweight design •Connects via SCSI port •Includes one syjet cartridge

$499.95 (SYQ SYJET1SE-09)

•Spare single syjet cartridge...(SYQ SYJET-005).....$124.95

MicroNet Drives



MicroNet Advantage
External 1-Gig Jaz Drive
•File size will no longer limit you, with the combination of Jaz drive and disks •Faster than most hard drives •1-GIG of disk space on each cartridge •Includes one cartridge

$519.95 (MNT AOV1000JAZE)

Micronet 200MB SyQuest Drive (MNT AOV-SYQ200E) $499.95
Micronet Internal Jaz 1-GIG Drive (MNT AV1000JAZI4) $579.95
2 Micronet 1-GIG Jaz Drives in one cabinet (MNT SS2000JAZA) $1149.95

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Global Village TelePort Platinum™
28.8Kbps Data/Fax Modem
•Send and receive data at up to 28,800 bps •Fax in background as you work •V.34 data compression for fast throughput up to 57.6Kbps •Flash ROM upgradable •Comes with GlobalFax™, GlobalFax™ OCR and data communications software for System 7 and later •For Macintosh desktops

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TelePort Platinum / Internet (GLV TELINTERNET)..... $199.95

Global Village

Global Village PCMCIA PowerPort Platinum™ PC Card
•28,800 bps data (v.34 data compression), 14,400 bps fax •GlobalFax™ and GlobalFax™ OCR and PC Card Enhancement software provided •PCMCIA card for Apple PowerBook 190 and 5000 series •Fits PCMCIA Type I and II slots

$339.95 (GLV PCMCIAPLTNM)

PCMCIA PowerPort Platinum Pro (GLV POWERPLTPRO)..... $499.95

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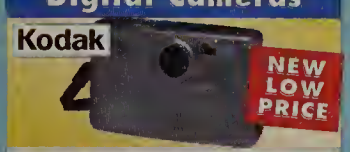
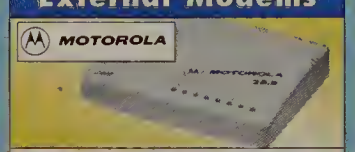


Kodak DC20
Digital Science™ Camera
•Shirt-pocket size •24-bit color •1MB storage •Focus-free lens with auto exposure •20-inch to infinity focus distance •Comes with software for Macintosh and PC

$299.95 (KOD DC20)

Connectix Color QuickCam (CNM CQCM) $229.95
Kodak Digital Camera 40 (KOD DC40) $599.95
Kodak Digital Camera 50 (KOD DC50) $999.95

External Modems



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Ext. 28.8Kbps Fax/Modem
•28,800 bps/14,400 bps S&R data/fax modem •V.42bis and MNP-5 with throughput up to 115.2Kbps •Communication & fax software for Mac

$119.95 (MOT MAC288SURF)

Zoom V34XMac External Fax/Modem (ZOP 2837) $139.95
Supra Express v.34 Fax/Modem (SRA 50-2BXP-MC) $159.95
U.S.Robotics Sportster®/Speakerphone (USR EX288MACVC) $199.95

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SyQuest EZ230
230MB External SCSI Drive
•230MB formatted •13.5msecond average access time •Reads 135 cartridges •Includes 1 235 cartridge

$299.95 (SYQ EZ230EXT)

SyQuest® EZ135 Drive (SYQ EZ135EXT) $119.95
SyQuest® 200MB Cartridge Drive (SYQ S914126) $399.95
SyQuest® 270MB Cartridge Drive (SYQ S9B4126) $399.95
Micronet 200MB SyQuest® Drive (MNT AOV-SYQ200E) $499.95

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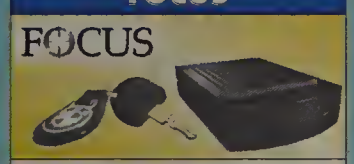
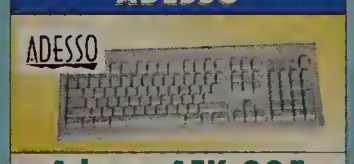


Focus L•TV Micro
Macintosh Presenter
•Converts Mac VGA/video signal to standard TV, so you can use TV as presentation device, or record video output from VCR

$149.95 (FOC LTVMICROMAC)

Focus LapisColor, video/ethernet exp. cord (FOC LCMV8-EN) $149.95
LapisColor MV16, 16-bit video cord for 5300 only (FOC LCMV16) $159.95
LapisColor MV16-EN, video/ethernet (FOC LCMV16-EN) $179.95

ADESSO



Adesso AEK-305
Soft Touch Plus Extended Keyboard
•105 silent, high quality, full stroke mechanical keyswitches •2 extra ADB ports •Keyboard-length wrist pad •One-year warranty

$54.95 (AEO AEK-305)

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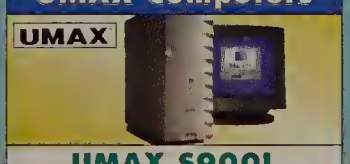
Adesso Tru-Form Keyboard (AEO AEK-606) $89.95
Adesso Tru-Form Keybd w/Pointer (AEO AEK-806) $99.95

UMAX Computers



UMAX S900L
180MHz Mac OS-Compatible MiniTower Computer
•180MHz 604e PowerPC™ CPU •32MB RAM •2.1GB hard drive •6.7x-speed CD-ROM drive •128-bit graphics card with 4MB VRAM •6 PCI slots, 5 expansion drive bays •Built-in SCSI, SCSI-2 and 10Base-T ports •2 serial and 2 ADB ports •Extended keyboard and mouse

$3799.95 (UMX S900L/180)

UMAX S900L 2GB hard drive (UMX S900L/150).....$3499.95

TRUEVISION

Truevision Bravado 1000
Professional Digital Video Editing Solution
•Includes the full Adobe *Premiere (4.2)*, a $795 retail value •Full screen video capture at 50/60 fields per second •Variable rate, real time motion JPEG compression •24-bit true color capture •Two composite inputs and one S-video input •Two simultaneous video outputs •32-bit PCI local bus with burst DMA •Conversion to popular computer video formats

$749.95 (TRU BRAVADOMAC)

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1GIG Jaz Cartridge
1GIG Cartridge
Iomega (BER MAC1GIGCART) $124.95 EA
Micronet (MNT CR1000JAZ) $124.95 EA

Iomega 100MB Zip Cartridge
(BER MAC100MBDSK) ...each $19.95
(BER MAC100MBTRI) .. 3 Pack $49.95
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SyQuest® Cartridges
44MB (SYQ SQ400) $39.95
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Simpson's Cartoon Studio
$29.95

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Reading Blaster Jr. $29.95
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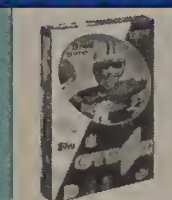

CybrCard
Brett Favre (ask for your favorite star)
$18.95

Titanic $42.95
DOOM 2 ..... $29.95
Hexen $29.95
MathBlaster Jr. $29.95
Worcraft II- Tides of Darkness $46.95
Nine Worlds, hosted by Patrick Stewart $29.95
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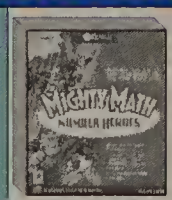

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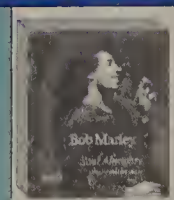

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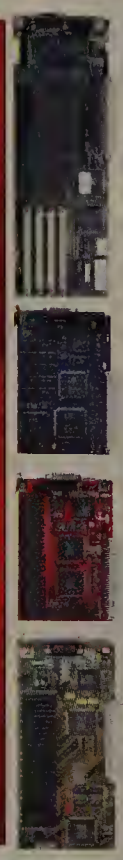

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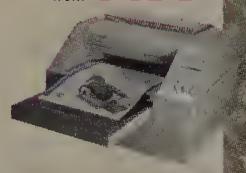

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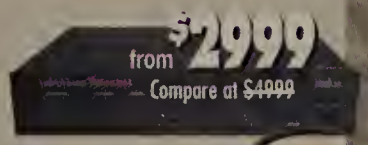

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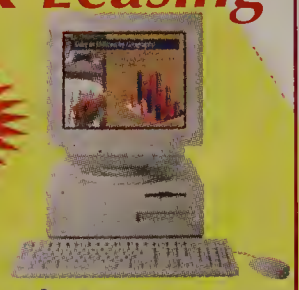

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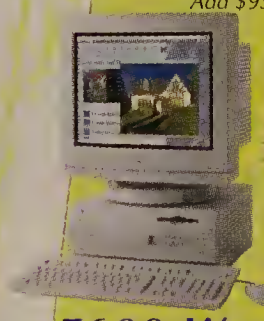

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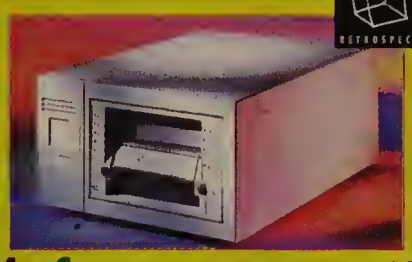

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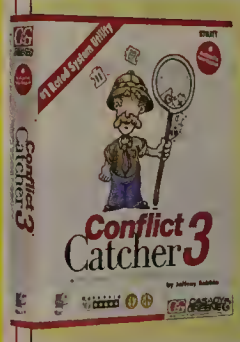

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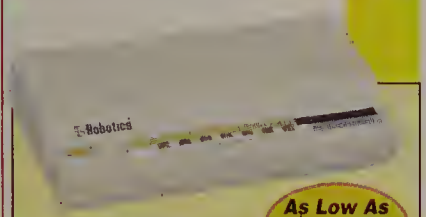

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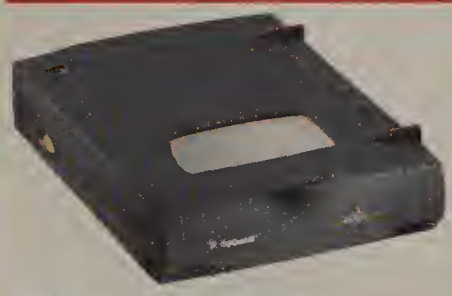

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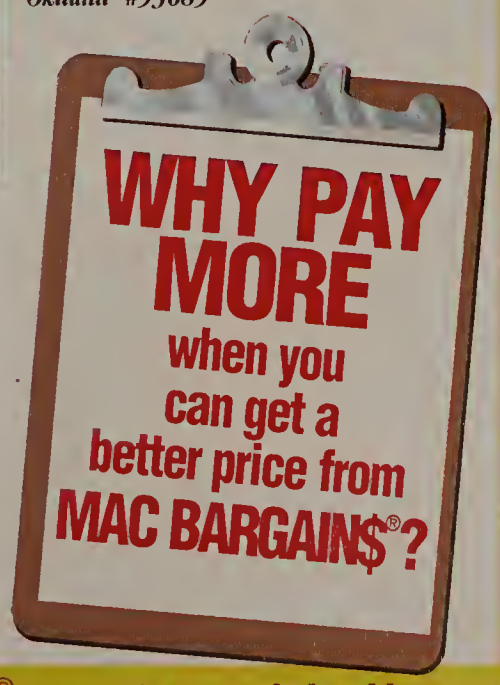

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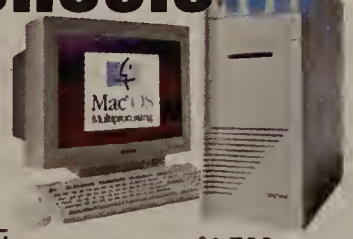

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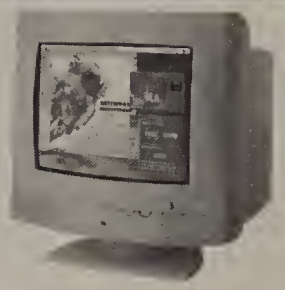

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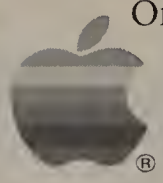

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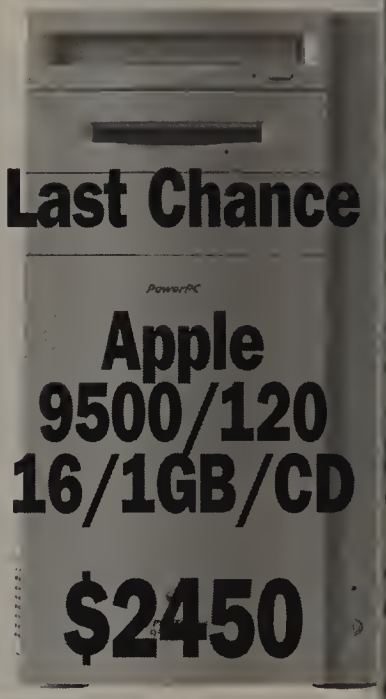

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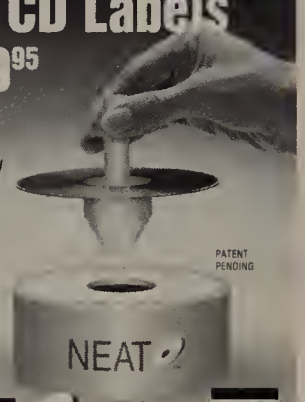

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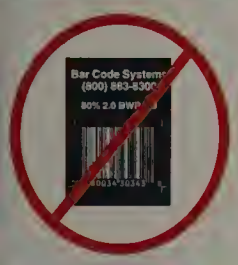

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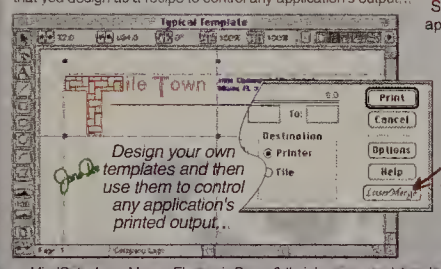

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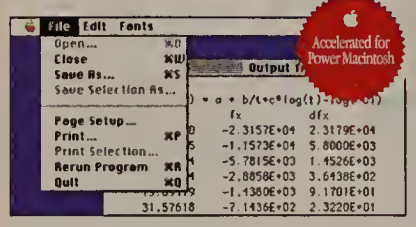

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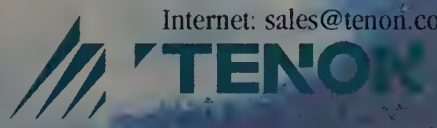

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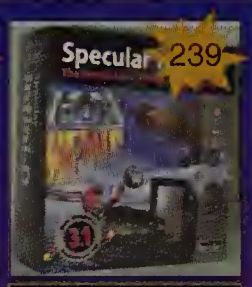

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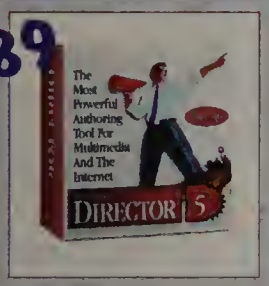

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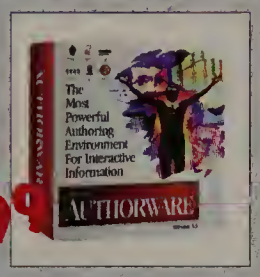

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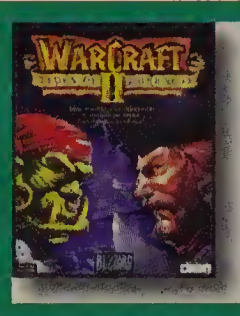

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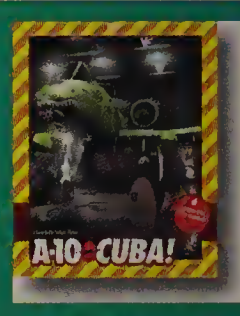

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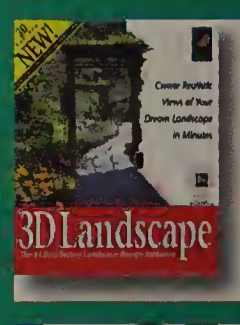

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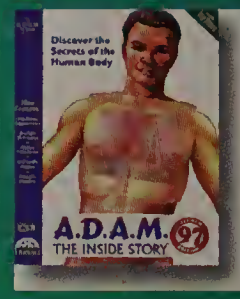

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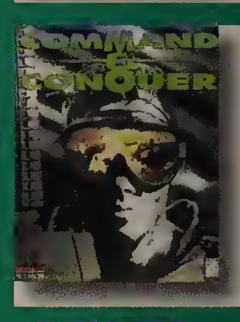

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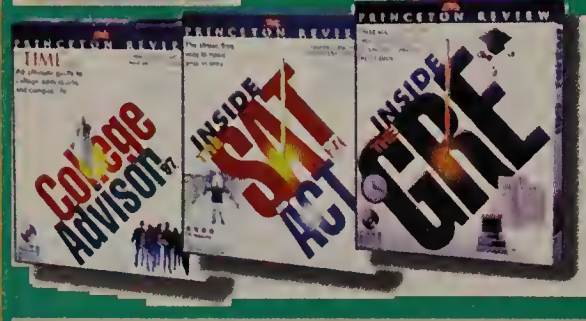

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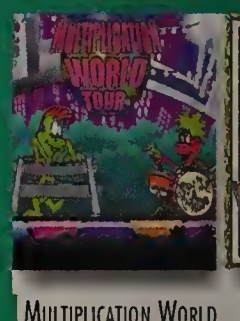

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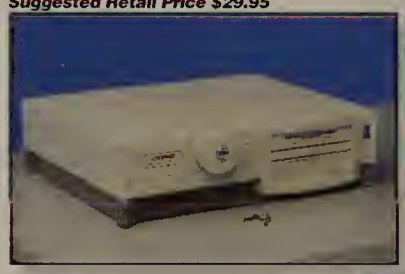

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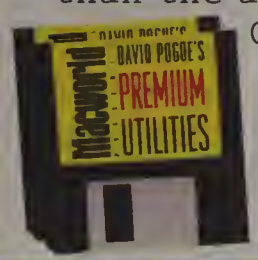

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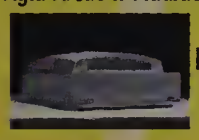

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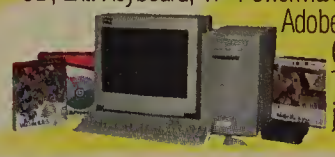

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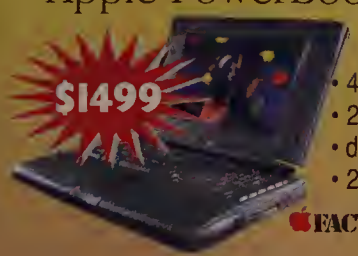

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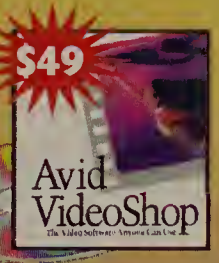

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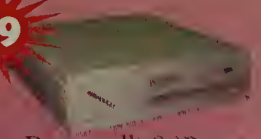

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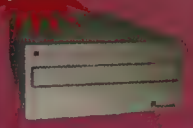

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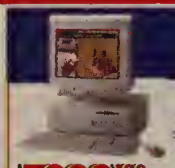

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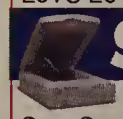

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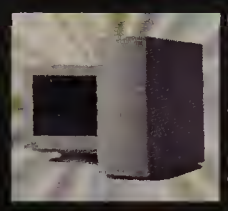

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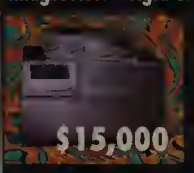

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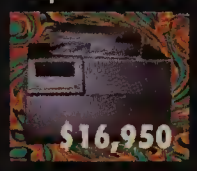

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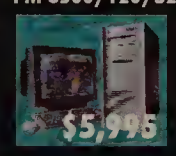

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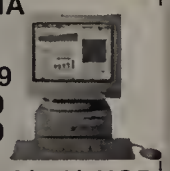

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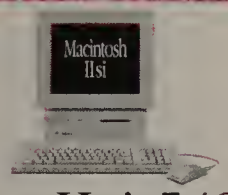

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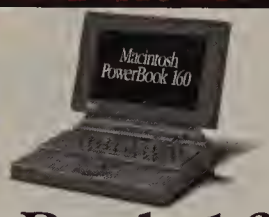

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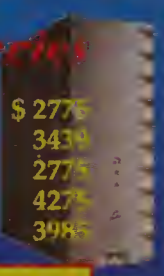

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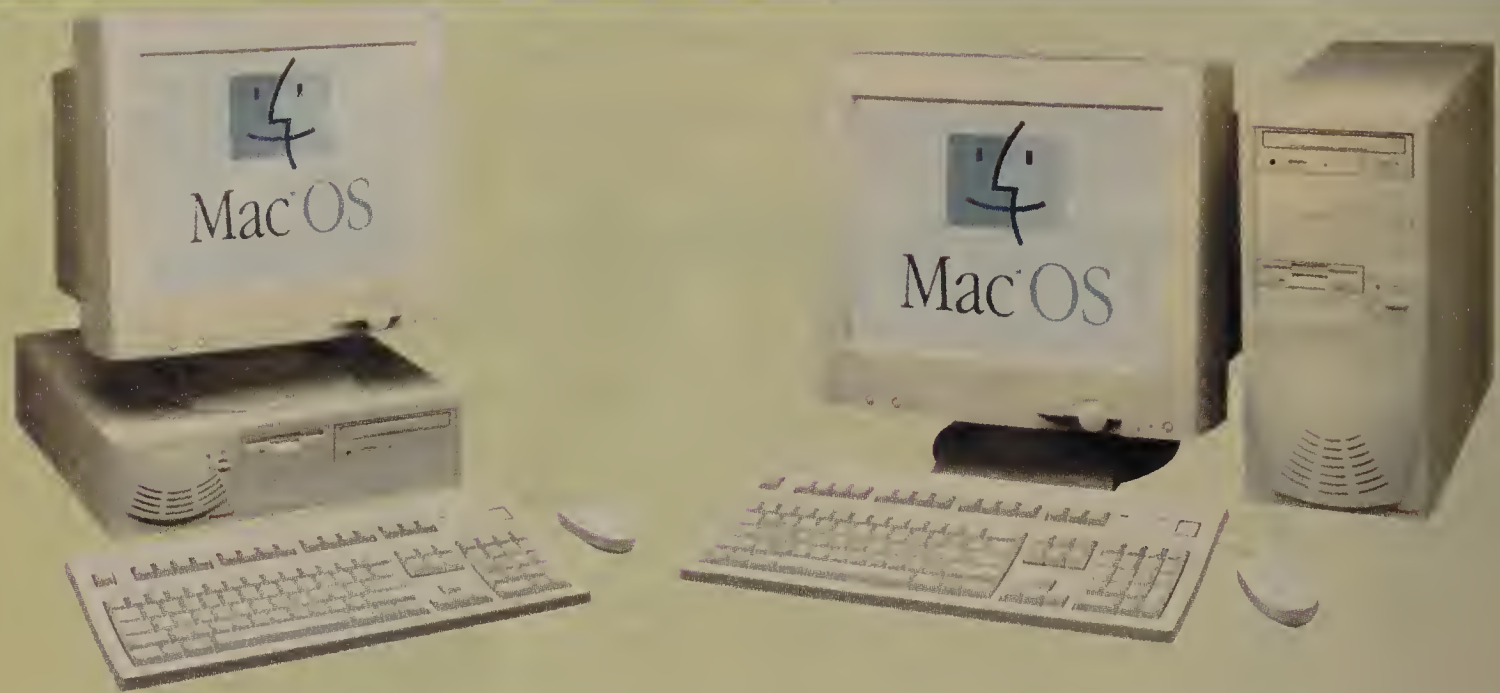

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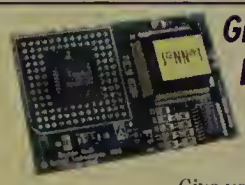

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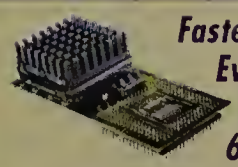

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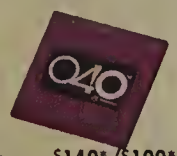

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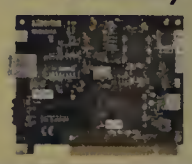

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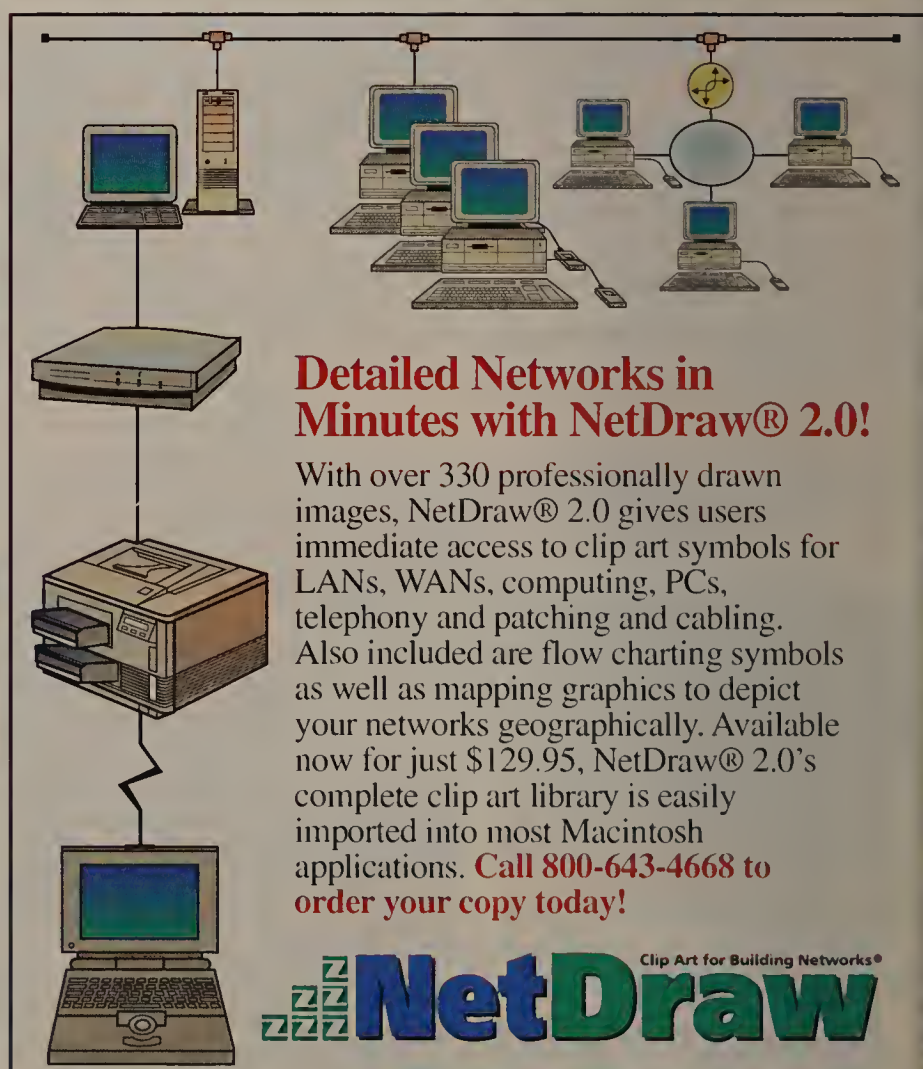

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continued from page 268
Each component matches,
Not bits and patches,
Unlike 7-5-point-3.
I'm longing for a dream System,
Small, stable, fast, and
trouble-free.
What we want, I think you'll agree,
Is called System 6-point-oh-3!

Violent Night
(to the tune of "Silent Night")
Silent Mac, broken Mac!
System bombed, screen went black.
Books suggested things; I tried
'em all:
Shift key, desktop file,
clean reinstall.
Now my deadline is tight,
This Mac's been silent all night.

Violent night, horrible night!
Lost my cool, filled with spite,
Threw my Mac through the
balcony door
Watched it fall from the
20th floor,
Now I'm sleeping in peace;
Thank God I had it on lease.

Prove It's So!
(to the tune of "Let It Snow")
Oh, the papers say Apple's dying,
But before we start good-byeing,
We should call them all up and go,
"Prove it's so! Prove it's so!
Prove it's so!"

They say "Mac OS software's scarcer."
We say, "Read those numbers,
there, sir,
Sales continued this year to grow.
There ya go, there ya go, there ya go!"

When they tell us Win 95
Made the Mac's famed advantages ebb,
We'll say, "Why, then, do Macs
now drive
60 percent of the Web?"

We can win our PR reversal—
Make the Mac be universal—
Though we may have some years
to go,
Make it so, make it so, make it so!

Happily Addicted to the Web
(to the tune of "Winter Wonderland")
Doorbell rings, I'm not list'nin',
From my mouth, drool is
glist'nin',
I'm happy—although
My boss let me go—
Happily addicted to the Web.
All night long, I sit clicking,
Unaware time is ticking,
There's beard on my cheek,
Same clothes for a week,
Happily addicted to the Web.

Friends come by; they shake me,
Saying, "Yo, man!
Don't you know tonight's the
senior prom?"
With a listless shrug, I mutter,
"No, man;
I just discovered letterman-dot-com!"

I don't phone, don't send faxes,
Don't go out, don't pay taxes,
Who cares if someday
They drag me away?
I'm happily addicted to the Web! **m**

If you really, really want to hear contributing editor DAVID POGUE singing these songs at the piano, pay a visit to *http://www.macworld.com*. You've been warned.

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Perfect example: Lately, whenever the Muzak in my grocery store starts playing those familiar Christmas carols, I've caught slightly different words popping into my head. Maybe I've been sitting at the Mac too long; maybe I've been reading too many computer magazines. No matter; I've written a few of them down for your holiday-party enjoyment. Buy a huge stack of *Macworlds*, hand them out at your next party, and host a sing-along no Mac fan will easily forget.

God Rest Ye Copland Programmers

(to the tune of "God Rest Ye Merry Gentlemen")

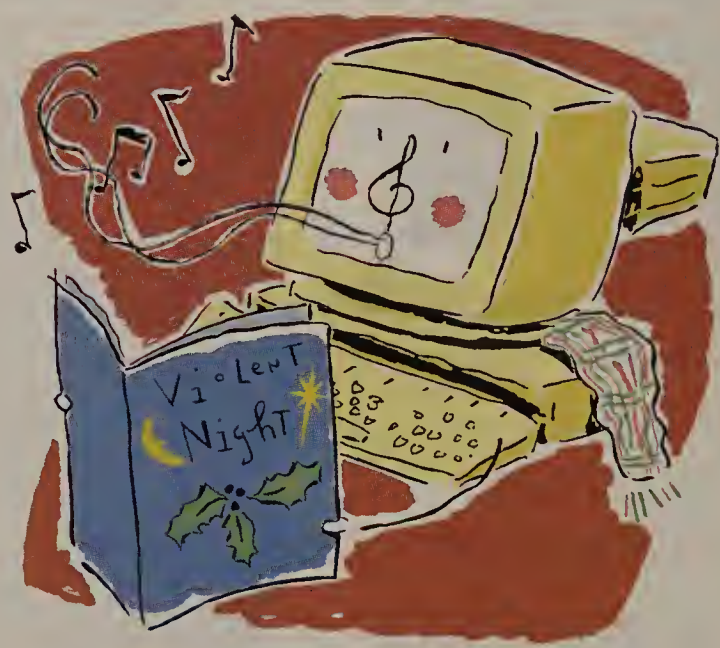
God rest ye Copland programmers,
It's finally Christmas Day.
You've all worked 20-hour shifts
Beginning back in May.
No wonder after such neglect
Your spouses moved away.
The last real meal you had
Was late last year—
That's what we hear;
And since then you've lived on
Pizza, Coke, and beer.

Your bosses change, and change
their minds,
Is Copland off or on?
Are last week's OS plans in place
Or now completely gone?
God rest ye well this Christmas Day,
You'd better sleep in late—
It's the last sleep you'll get till '98.
Isn't that great?
It's the last day off you'll have till '98!

The Bill Gates Song

(to the tune of "The Christmas Song")

Netscape roasting on an open fire,
Apple begging on its knees,
Photo popping up on *Time* magazine,
Yes, Bill Gates dreams of days
like these!
Everybody knows he's never fully
satisfied,
Throws himself behind each task,
World dominion is his company's goal.
Well, hey, is that so much to ask?
He knows the world is in his sway,



We'll buy whatever software he might
toss our way,
We'll surf his Internet, watch his TV,
He'll take us anywhere we ask him—
for a fee.

And so we're offering this
simple prayer,
To Bill and all his MS grunts:
Since we all follow any standard
you write,
Make it good, please,
Make it good, please,
Make it good, please, just once!

Gil Amelio's Coming to Town!

(to the tune of "Santa Claus Is Coming to Town")

You better watch out,
Absurd as it sounds,
'Cause Apple's about
To lose a few pounds—
Gil Amelio's coming to town!

He's making a list,
And trimming the rolls
Of projects that missed
Their revenue goals—
Gil Amelio's coming to town!
He knows what's losing money,
Like eWorld, PowerTalk . . .
You'd better make your project work
Or prepare to take a walk!

Though you follow his lead
Right out the back door,
You know he'll succeed—
He's done it before!
Gil Amelio's coming to town!

Microsoft

(to the tune of "Jingle Bells")

Nine-tenths of a gig,
Biggest ever seen,
God, this program's big—
MS Word 15!
Comes on ten CDs,
And requires—damn!
Word is fine, but jeez—
60 megs of RAM?!

Oh! Microsoft, Microsoft,
Bloatware all the way!
I've sat here installing Word
Since breakfast yesterday!
Oh! Microsoft, Microsoft,
Moderation, please.
Guess you hadn't noticed:
Four-gig drives don't grow on trees!

I'm Dreaming of a Clean System

(to the tune of "White Christmas")

I'm dreaming of a clean System,
Something that fits on one CD.

continues on page 266

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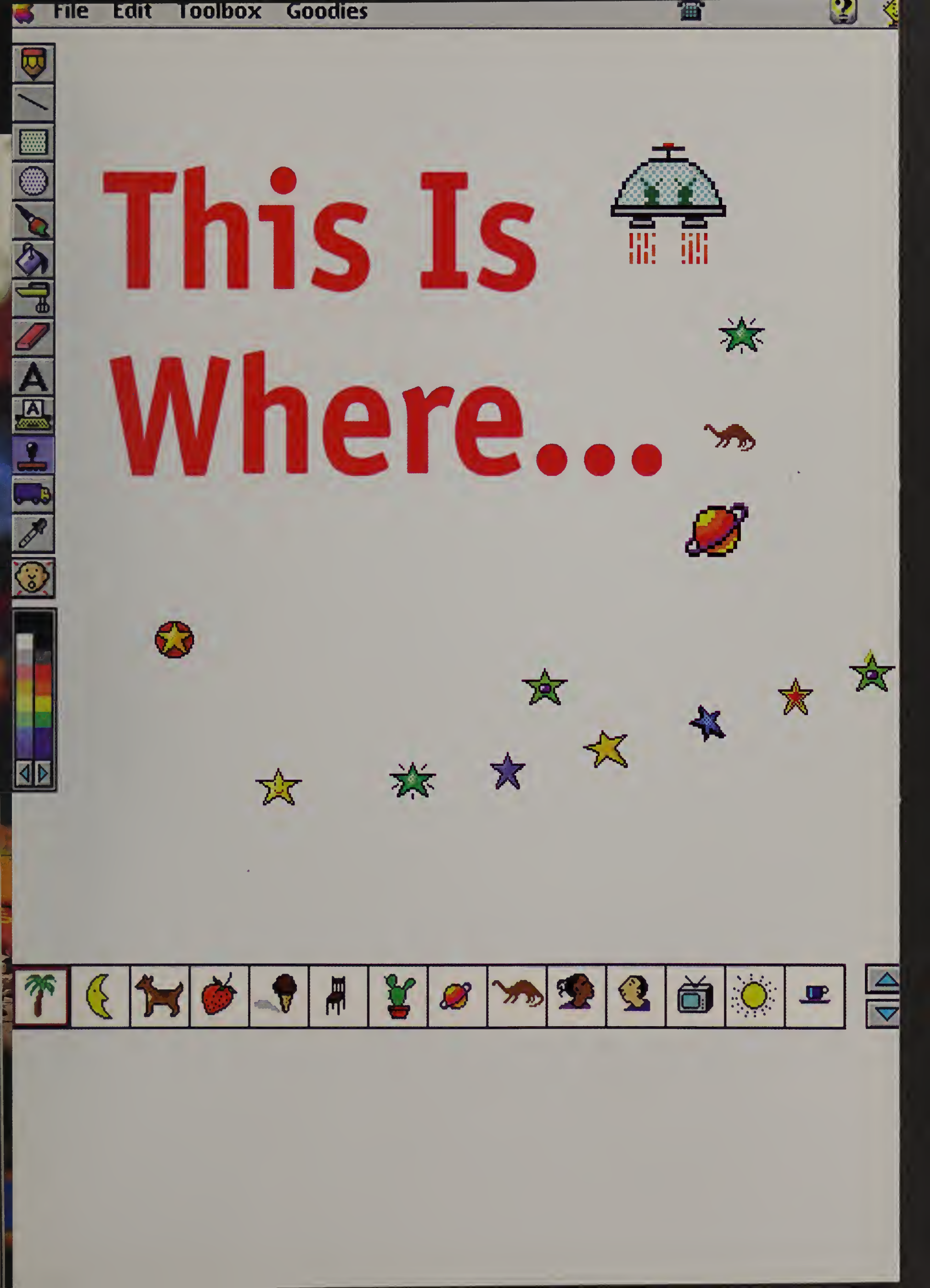
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Janet and her favorite pop-up menu.

When Janet's clients want a design changed, they want it changed yesterday.

Good thing Janet has Turbo Mouse® 5.0, the all-new high-performance trackball from Kensington.

Turbo Mouse is no ordinary mouse. Its unique four-button design and intelligent software let Janet execute multi-step commands with a single click.

And she saves even more time by organizing the commands in a convenient and personalized pop-up menu.

One click brings up the menu. Another click executes a command, like changing the colors or fonts.

One click even bills her clients. That's because Janet has set up her pop-up menu to access her clients' invoice files.

But pop-up menus are not just for desktop publishing. You can use them for word processing, spreadsheets, just about anything.

Easy-to-program, easy-to-use, your favorite programs will run better. You'll work faster. You'll save valuable time.

Turbo Mouse 5.0 features a new four-button design, a large, comfortable ball, and stainless steel bearings for ultrasmooth movement. And because it's a trackball, you also save desk space.

Kensington Mouse, our new two-button conventional mouse, features a tapered shape, a symmetrical design and inclined sides for more comfort and control.

Acclaimed by users and critics alike, Kensington mice have won more awards than any other input device. And they all come with the unique Kensington Satisfaction Guarantee, which includes a 5-year warranty, toll-free support and a no-risk 90-day trial.

Compatible with System 7.5 and Power Macintosh.

For more information, please call 800-535-4242.

KENSINGTON

Turbo Mouse 5.0
Kensington Mouse

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